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MALE FERTILITY*

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This presentation includes a description of an improved method for judging the degree of male fertility, and the practical application of this testing in the study of the male.

The male should possess an adequate number of normal spermatozoa. This statement immediately raises two questions: What are the characteristics of normal spermatozoa ? ; and What is an adequate number of them ?

It may not be possible to list all of the characteristics of normal spermatozoa, but it is reasonable to believe that one of them is normal motility. If the spermatozoon cannot move it is obvious that it cannot reach the ovum. The movement should be progressive and with a certain speed. Until standards of normality of spermatozoa, other than that of movement, are established, motility of the kind just described might be considered the chief indication of normality. [The film "Human Spermatozoa—Morphology and Motility" was shown at this point.]

The number of active spermatozoa in an ejaculate which are required in order to make fertilization possible is unknown. However, while it is agreed that a single spermatozoon only is actually required for fertilization, yet we realize that the greater the number of active spermatozoa available in an emission the more likely the possibility that a single one may reach the site of fertilization. Theoretically, it was found that 70 million active spermatozoa (Farris, 1950b, p. 173) deposited in the vagina would be required for one spermatozoon to reach the ovum in the upper third of the oviduct. The following observations may throw some light upon the requirements for male fertility.

In my opinion, no previously described method supplies a satisfactory measure of male fertility. Since fertility is dependent on active spermatozoa, it is felt that such criteria as the number of fixed spermatozoa per cubic centimetre, the volume of the specimen, the morphology, and an estimate of the percentage of motility should be supplemented by a count of the number of active spermatozoa in the total ejaculate. Hotchkiss (1944) stated : "A new and simple method for enumerating and grading motility is needed to meet the requirements encompassing all factors concerned with motility of sperm." This includes the actual percentage of active cells, type of motility, and duration of activity.

Technique

With these needs in mind, I have developed what I believe is an improved method for estimating the index of fertility of the male. The technique is as follows :

After five days of freedom from emission, the individual collects his total ejaculate in a sterile wide-mouthed bottle, either by masturbation or by coitus interruptus. The specimen is never collected in a rubber sheath, and must not be heated. It is examined one hour later in order to permit a certain degree of liquefaction to take place. The examination consists primarily in computing the number of active spermatozoa in the entire ejaculate.

The counting is carried out in the following manner. A few drops of the well-mixed semen are diluted 1 in 20 with Locke's solution in a white-blood-cell counting pipette. The moving cells are counted upon a red-blood-cell counting-chamber, using the low-power objective of the microscope. The number of active spermatozoa per cubic centimetre of the specimen is computed. With the volume of the ejaculate known, the total number of active spermatozoa in the entire ejaculate is determined. The resulting figure, referred to as the absolute motility, and expressed in millions of active cells, is employed as the measure (index) of the individual's fertility. [The film "Human Semen Analysis: a Technic for Counting Motile Spermatozoa" was shown at this point.]

A basis for classification of male fertility (Farris, 1949b) was determined by the comparison of semen analyses of three groups of men : (*a*) those whose wives conceived without difficulty, and who had had two or more children ; (*b*) men whose wives conceived with difficulty ; and (*c*) individuals whose wives failed to conceive. With the absolute motility figures from each of these three groups of men as the unit of measurement, it is possible to classify male fertility in one of the four following categories : (*a*) high fertility (185 million or more active spermatozoa), (*b*) relative fertility (80 to 185 million active spermatozoa), (*c*) subfertility (below 80 million active spermatozoa), and (*d*) sterility (with no active spermatozoa).

With the co-operation of medical students and physicians, three sets of observations were made to determine

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the effects on their active spermatozoa counts of (1) frequency of emission, (2) ageing of spermatozoa *in vitro* and *in vivo*, and (3) physical fatigue. [The film "Human Semen Analysis: Motile Spermatozoa as an Index of Fertility in Men" was shown at this point.]

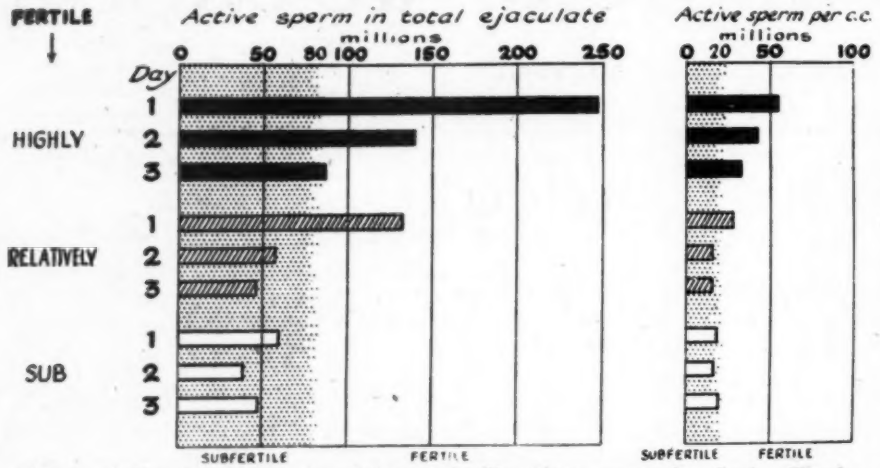

FIG. 1.—Active spermatozoa in relation to fertility (three consecutive days). Showing effects of daily emissions on three groups of men with different degrees of fertility. Note that (1) the highly fertile group remains fertile (80 million or more active spermatozoa) for three consecutive days; and (2) the relatively fertile group is fertile only on the first day.

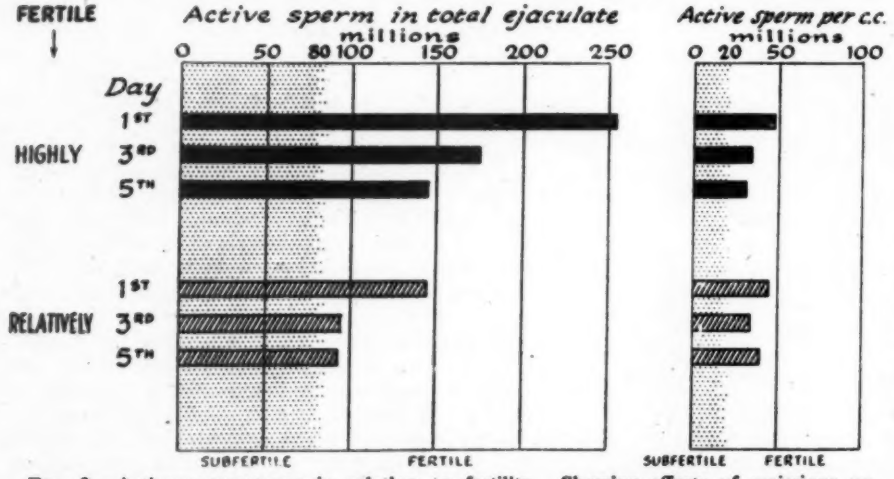

FIG. 2.—Active spermatozoa in relation to fertility. Showing effects of emissions on alternate or at two-day intervals on two groups of men with different degrees of fertility. Note that (1) the highly fertile group remains fertile for three days; and (2) the relatively fertile group drops to a lower level of fertility.

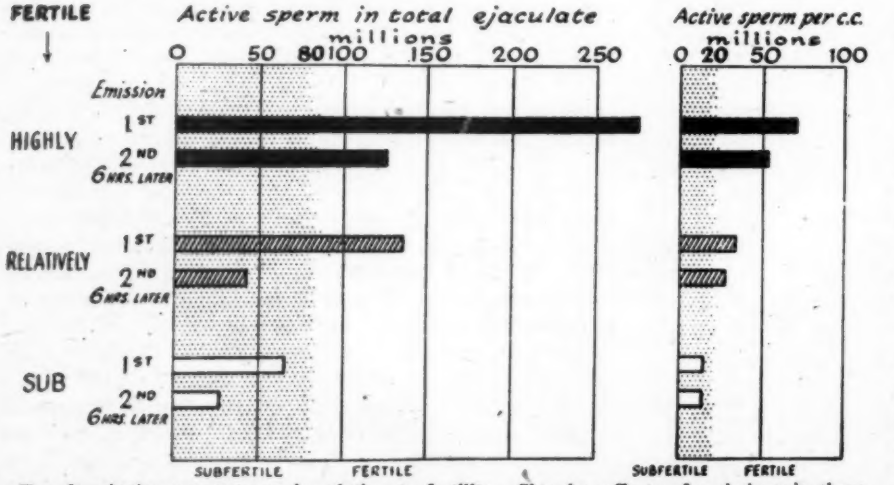

FIG. 3.—Active spermatozoa in relation to fertility. Showing effects of emissions in three groups of men with different degrees of fertility. Second sample of semen obtained six hours later. Note that only the highly fertile group recovered to a fertile level.

Effect of Frequency of Emission

Spermatozoa Counts on Three Consecutive Days: Groups of Individuals.—Fig. 1 shows the differences in the average counts of active spermatozoa secured on three consecutive days. The highly fertile group is fertile (above 80 million active cells) for three consecutive days. The relatively fertile group is fertile only on the first emission after five days' abstinence. The second and third emissions place these individuals in the subfertile class (fewer than 80 million active cells). This observation offers an important distinction in the differential classification between highly fertile and relatively fertile individuals. Those persons who possess 185 million or more active spermatozoa after five days' abstinence continue to have active cell counts above the 80 million level of fertility on the next day, while those with fewer than 185 million active spermatozoa on the first day drop below the 80 million level into the subfertile class on the next and subsequent days. The subfertile males exhibit an unsatisfactory count during the entire three days of testing.

Spermatozoa Counts at Two-day Intervals: Groups of Individuals. — Fig. 2 shows the differences in the active counts of two groups of males at two-day intervals. The two groups are similar in that both show a definite drop in the active cell count. The semen specimens of the relatively fertile group dropped to practically a subfertile level.

Spermatozoa Counts at Three and Four-day Intervals: Groups of Individuals. — Our observations show that the highly fertile group dropped to the relatively fertile class in three-day intervals. The four-day interval count often reached the level of the first (control) count. The relatively fertile group remained in the relatively fertile class at three-day intervals, but often failed to reach the level of the first emission after a four-day interval.

Spermatozoa Counts at Six-hour Intervals: Groups of Individuals.—Fig. 3 shows the absolute motility count of specimens of semen secured at the end of six hours. The highly fertile group became relatively fertile. The relatively fertile group, with

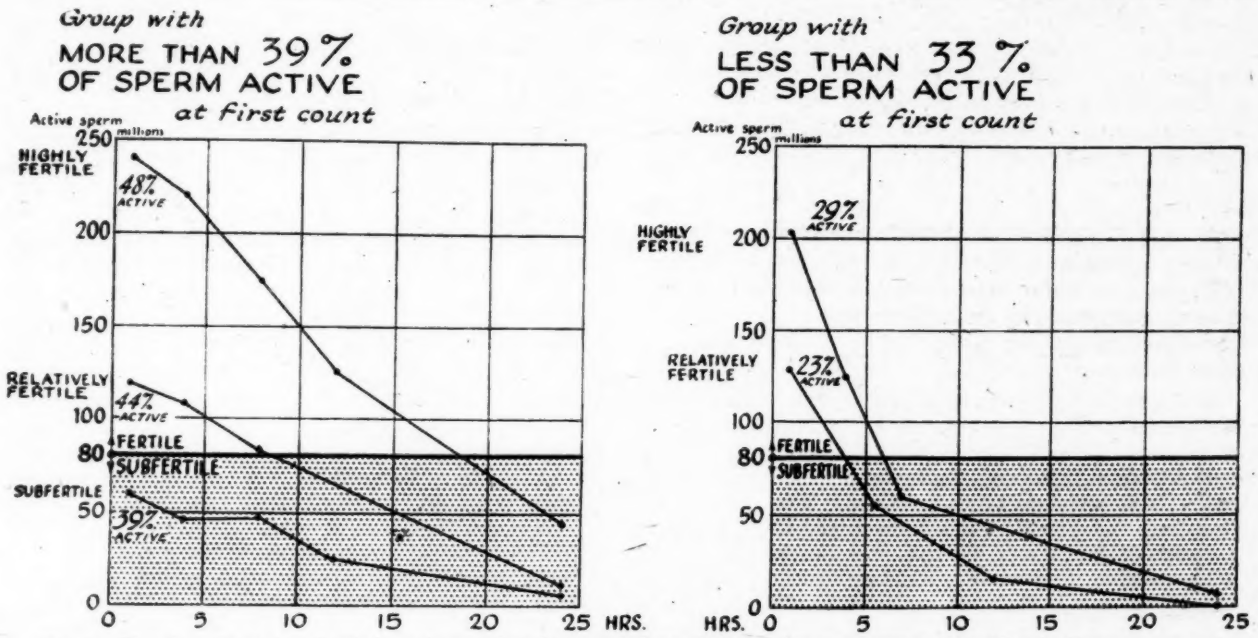

FIG. 4.—Showing effects, in a bottled specimen, of ageing on total number of active spermatozoa (45 subjects). Counts were made at intervals during a 24-hour period. The highly fertile group with more than 39% active cells maintained a higher degree of fertility for a longer period of time than did the group with less than 33% of active cells at start of observations.

136 million motile spermatozoa, became subfertile and showed a count of 43 million active cells in six hours. The subfertile group remained subfertile, with a count of 28 million moving spermatozoa. This finding is of value, particularly for the borderline individual. Coitus practised twice within six to eight hours would make available a greater number of active spermatozoa at the optimum time for fertilization than if intercourse were practised only once.

From our observations we conclude : (1) a minimum of five days' abstinence is required for most men to reach their maximum level of fertility ; (2) emissions either daily or on alternate days reduce the relatively fertile male to practically a subfertile level ; and (3) coitus twice within six to eight hours may prove a useful method for aiding the wife of the relatively fertile or subfertile husband to conceive.

Effect of Ageing on Spermatozoa

Another set of observations was carried out in order to determine the effect of ageing upon the motility of spermatozoa when maintained (1) *in vitro* in the specimen bottle for 24 hours, and (2) in the female reproductive tract for 24 or more hours.

Ageing In Vitro

Fig. 4 shows a comparison of findings from specimens collected *in vitro*, secured from two groups of men classified as highly fertile, two groups classified as relatively fertile, and one group classified as subfertile. The specimens were examined at intervals over a period of 24 hours. The spermatozoa from the highly fertile first group, with the higher percentage of motility, maintained their motility at the fertile level for approximately 19 hours. The spermatozoa of the relatively fertile group maintained their motility at the fertile level for only nine hours. The second highly fertile group, with less than 33% active cells at the start, dropped in cell motility below the fertile level within a period of six hours. Although not shown in the graph, we observed, in those specimens beginning with a lower motility, that the progressive action of the spermatozoa changed to an oscillating type of action within a very few hours, and the cells became inactive in about 12 hours.

These observations suggest : (1) Specimens classified as highly fertile may remain in this classification *in vitro* for about 19 hours, while specimens in the relatively fertile group remain in that classification for only nine hours ; (2) for proper classification, semen specimens should be examined preferably within the first and second hours after the emission, because of the rapid drop in motility.

Ageing In Vivo

The duration of the life of spermatozoa was studied in the female reproductive tract. With the aid of several co-operating Philadelphia gynaecologists, hysterectomies were performed on patients after insemination with highly fertile semen. Normally progressive spermatozoa were recovered from the cervix, uterus, and oviducts up to 48 hours after insemination. In view of the normal progressive motility of spermatozoa at the end of this time, it is believed that they could have lived much longer. I believe, however, that the fertilizing power of the semen is lost in about 12 to 24 hours, because when inseminations were carried out 24 hours before or after the predicted time of ovulation no conceptions resulted.

Effect of Physical Fatigue on Spermatozoa

In view of the fact that physical fatigue is believed by many to affect spermatozoa, observations were undertaken to test its effect on the semen count. Semen specimens were secured from eight college football players, six of whom were fatigued by a competitive game. The degree of fatigue was rated by the differential blood count, on the basis of previous work (Farris, 1943). Fatigue is indicated when the lymphocyte count averages between 10 and 20%, rather than the normal of 25 to 35%. Six players who averaged 53 minutes' playing time

showed practically the same semen counts as their controls, studied three weeks later. Two players who averaged 15 minutes' playing time also showed practically no changes in their semen counts.

It is concluded from these observations that extreme physical fatigue does not affect the spermatozoa counts.

Variations in Semen Analyses

Observations were made to determine what variations occur in the semen of an individual over a period of time. It was important to determine the reliability of a single semen analysis when compared with repeated examinations at other times.

Our observations (Farris, 1950b, p. 135) indicate that the counts of the highly fertile male remain constant on re-examinations, and keep him in the highly fertile class. For this reason, repeat counts on the highly fertile men probably are unnecessary. On the other hand, the counts of relatively fertile and subfertile individuals are more variable. Consequently re-examinations of these persons are necessary before final judgment is passed regarding their fertility.

Temporary Subfertility or Sterility.—In addition to normal variations in semen analyses, we have observed that occasionally individuals exhibit temporary subfertility or even sterility, resulting from illnesses, type of work, or other conditions. For example, one patient had absolute motility counts of 64 million and 35 million spermatozoa after a severe throat infection which required admission to hospital for about a week. A year and a quarter later his semen analysis revealed 188 million active cells, and soon afterwards his wife conceived.

In another instance a patient had 14 million, and on re-examination 8 million, active spermatozoa in the total ejaculate. Several months later this individual became azoospermic. It was learned that he was taking steam baths regularly once a week. After six weeks without taking steam baths he revealed a 20 million absolute motility count.

Criteria of Normal Semen

The standards given in Table I were derived from the data from the foregoing observations and from the findings gathered from other semen analyses on proved fertile males. The median values listed in Table I were secured from a study of 200 samples of spermatozoa. These specimens were secured from husbands whose wives conceived while the couples were being studied for sterility.

TABLE I.—*Standards*

Minimum Standards for Fertility	Median (Based on 200 Pregnancies)	Range
Volume: 2·5 ml. up	4 ml.	1·1–11 ml.
Speed: 0·7–1·2 sec.*	1 sec.	0·5–3·6 sec.
Morphology: 80% or more oval forms	87%	48–99%
Motility: 38% active spermatozoa	44%	15–68%
Active per ml. : 20 million up	51 million	10–148 million
Index of fertility is based on the number of active spermatozoa in the entire ejaculate in millions. (Absolute motility.)		
Highly fertile .. 185 up	209 million	45–729 million
Relatively fertile 80–185		
Subfertile .. 1–80		
Sterile 0		

* Speed is based on timing of 25 progressive spermatozoa.

If the first specimen is relatively fertile, subfertile, or questionable, re-examination should be made in about a month. Eighty million moving cells in the entire ejaculate are required for conception by coitus. (Semen analysis is preceded by five days' abstinence.)

An occasional pregnancy (in about 3% of the cases) has occurred when the semen analysis failed to measure up to the above minimum standards.

The minimum standards for fertility are based upon semen specimens secured from husbands whose wives experienced difficulty in conceiving because of less satisfactory specimens. Pregnancy occurred in only about 3% of the cases in which the semen analyses failed to measure up to the minimum standards. Yet, in advising males regarding their fertility status, we tell them that so long as they have active spermatozoa there is a chance of fertilization, no matter what the count may be. We emphasize, however, that the higher the total number of moving cells in the ejaculate the greater the possibility of conception.

The wives of 10% of the subfertile men conceived after being aided by precise ovulation timing and proper coital advice.

Fertility in Relation to Age

Table II shows that in early reproductive life fertility can be classified on the basis of absolute motility, and that this degree of absolute motility probably remains more or less constant throughout the greater part of the reproductive period. Data beyond age 45, based upon 16 cases, are insufficient to permit accurate classification. The fertility level does not change with age, as shown by statistical analysis of the semen specimens of the group. The summary of all ages indicates that 70% of the men were highly or relatively fertile; and 30% were subfertile or sterile, since 7% had no sperm cells.

TABLE II.—*Percentage Index of Fertility According to Age Groups*

Age	Classification in Percentages			
	Highly Fertile	Relatively Fertile	Subfertile	Azoospermia
14–20	41	37	15	7
21–25	43	35	16	6
26–30	38	30	26	6
31–35	39	29	23	9
36–40	35	32	25	8
41–45	48	26	26	0
46+	25	25	44	6
Whole group (643 individuals)	39	31	23	7
	70		30	

Frequency of Intercourse

The information presented above can be applied practically when the facts regarding the normal frequency of intercourse in the human male are known. Table III lists the frequency of coitus of married white males with fertility problems. The average rate in this

TABLE III.—*Frequency of Intercourse of Married White Males with Fertility Problems*

Age	Average Coital Rate Per Week	No. of Individuals
21–25	3·0	37
26–30	2·8	147
31–35	2·8	164 } 84%
36–40	2·4	94
41–45	2·1	28
46–50	2·2	8
Total No. of Individuals		478

group for ages 21 to 35 is three times a week, and from 36 to 50 a little oftener than twice a week.

Since relatively fertile and subfertile individuals become infertile unless they have a rest period of five days, for conception purposes it is particularly necessary that these individuals abstain from intercourse for five days before the anticipated day of ovulation.

Clinical Observations

The routine procedure in studying, counselling, and treating the childless couple has been as follows: (1) The number of active sperm cells in the total ejaculate of the husband is determined; (2) the patency of the wife's Fallopian tubes is studied by hysterography; (3) the wife is timed for the date of her ovulation. Knowledge of these three conditions has made it possible in many cases to predict with a considerable degree of accuracy whether or not conception will occur.

One Hundred Sterile Couples: Classification of Husbands.—Consideration of how 100 so-called sterile couples were aided through our laboratory may be of interest. Of 100 husbands 40% were classified as highly fertile, 30% as relatively fertile—a total of 70% considered fertile—10% were classified as subfertile, and 17% as sterile, the latter possessing no spermatozoa. In this group of 100 couples there were three instances in which there existed an Rh blood incompatibility. Of the 100 wives, 23 conceived after donor insemination. It is interesting to note that the classification of the fertility of these 100 husbands agrees closely with that of another larger group of 643 men, of whom 70% were considered fertile and 30% subfertile. We might add that in a third series of 1,000 counts on both married and unmarried men the findings were similar.

One Hundred Sterile Couples: Classification of Wives.—Factors which contributed to sterility in the 100 wives are as follows: Tubal obstructions, 13%—it is probable that lipiodol may have aided in these cases—7% of the women had endocrine disturbances, 2% had bicornate uterus, and in 1% a congenital anomaly was evident in which only one ovary was present. Every wife conceived after being aided by determining the time of ovulation by my method (Farris, 1946b). The menstrual cycles averaged 24 to 37 days in length. Conceptions occurred during cycle days 9 to 23, inclusive. The great majority of conceptions occurred on cycle days 11, 12, and 13. The individuals who conceived on cycle day 11 demonstrated average menstrual cycle lengths of from 24 to 31 days.

Treatments: Effect on Subfertile Men

Gonadogens, thyroid, various pituitary products, and four types of vitamin E were administered to a series of subfertile men with the object of improving their sperm counts. No improvement was noted in any of the cases.

Another series of subfertile men received pituitary irradiation with the same objective in mind. These individuals fell into two groups. The first group exhibited 50 million or more moving cells—80% of these individuals responded to the treatment, but this response was only temporary. The second group had fewer than 50 million moving cells. This group responded, but not to the same extent as the preceding group.

Aids to Male Fertility

The following recommendations are offered. (1) Classify the males regarding their fertility on the basis of the total number of active spermatozoa in the ejaculate. (2) Advise the couple to abstain from intercourse for the five days prior to the day of ovulation. This brings the active sperm count to its highest level. (3) When the ovulation date can be determined, concentrate coitus on the precise day. Otherwise, advise coitus during the fertile period—namely, cycle days 11, 12, and 13, depending upon the length of the average menstrual cycle. (4) For the subfertile male, concentrate coitus twice within eight hours on the day of ovulation. For the relatively fertile male, concentrate coitus twice within eight hours or in the late evening and the following early morning, about the time of ovulation. For the highly fertile male, advise coitus for three consecutive days during the selected period. The female should be studied for factors which may contribute to sterility.

It is hoped that the application of the observations which form the basis of this paper may be useful in helping to solve some of the problems which arise in the diagnosis and treatment of sterility in the male.

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The fifth annual conference of Army Pathologists was held on October 4 and 5 at the Royal Army Medical College, Millbank. On the first morning demonstrations were given of Price's precipitation reaction, a technique for Rh blood grouping using small quantities of serum and devised by Major I. D. P. Wootton, and a number of histopathological sections of rare and interesting tumours. An administrative meeting was held in the afternoon. On the second day, lectures were given by guest lecturers. Dr. C. H. Andrewes, F.R.S., spoke on the epidemiology of influenza, and was followed by Dr. A. Isaacs on the laboratory diagnosis of this disease. Professor R. J. V. Pulvertaft described phase-contrast microscopy, and illustrated his talk with a film made by intermittent photography of bacterial slide cultures using this technique. Professor N. F. Maclagan ended the morning session with a lecture on liver function tests. Sir Alexander Fleming, F.R.S., chose as his subject bacteria versus antibiotics, and Dr. H. J. Parish discussed some aspects of immunity following injections of toxoids.

SEXUAL DISORDERS IN WOMEN: THEIR MEDICAL SIGNIFICANCE

BY

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In this country, sexual disorders of the male have been fully described and classified by Walker, Strauss, and others; yet, curiously, great confusion exists about the equivalent disorders of women. This may be because the disabilities are mainly subjective and are therefore less readily manifest. In fact, however, most of them fall readily into quite simple categories.

There are cogent reasons for classifying the various feminine disabilities. Practitioners nowadays—appreciating that certain sorts of sexual frustration can cause symptoms of anxiety neurosis—are apt to confuse these types of disturbance with others which produce no symptoms whatever, and which cannot in any case be reasonably subjected to medical treatment. Thus certain disorders may be referred unnecessarily for advice on sexual technique or for a change of contraceptive method, whilst others, which may be causing obscure psychosomatic symptoms, tend to pass unrecognized.

I shall exclude here the rare cases of disorder due to endocrine or developmental abnormality. Although fatigue, deficiency of thyroid hormone or oestrogen, diabetes, and so on may produce a secondary frigidity, in the overwhelming majority of cases the disability is psychogenically determined.

Terminology

The word "frigidity" requires definition. It is generally used to describe cases in which there is an absence of the characteristic erotic sensation in either the vagina or clitoris, or in both. But psychiatrists sometimes apply the term in a more special way—namely, to any condition where the woman is unable for intrinsic reasons (that is, not because of incapacity of the husband) to attain orgasm, even if her erotic feeling is extremely urgent. This application of the word seems calculated to confuse patient and doctor, and I have known it to cause great offence, the woman feeling that such capacity as she has is being belittled. To my mind, "frigidity" should be reserved for a woman who lacks emotional or physical response *to the sexual relationship under discussion*. Thus, disinclination and lack of tumescence are symptoms of frigidity; yet a woman who experiences no erotic feeling whatever may suffer from neither. There is need for a term to describe the large group of women who can experience erotic sensation, in greater or lesser degree, but insufficiently to attain orgasm. Until such a term is coined they must be described as "lacking orgasmic capacity."

Theoretical "Norm"

Because confusion exists, it is necessary to be clear about what is normal in feminine sexual response.

As in the male, genital stimulation normally culminates in orgasm—automatic, rhythmic contractions of the genital muscle. If the eroticized area is clitoral, the outer muscles of the vulva only are involved; if the vagina or cervix is sentient and is stimulated, the inner pelvic muscles will be involved as well. Although some women cannot distinguish between clitoral and vaginal orgasm, usually the functions are quite distinct. A woman who can get both types of orgasm nearly always values the vaginal one most; normally it evokes a deeper emotion and is more satisfying. But when inhibition is present—as it so very often is—it is generally the vagina which first experiences some suppression of feeling. Probably only one woman out of three is regularly capable of vaginal orgasm, whereas perhaps three out of four can get clitoral satisfaction. As some degree of disability is so very common, a practitioner should be cautious in making comments about sexual inadequacy, for harm can be done to a woman's self-esteem by unnecessary criticism. From the clinical standpoint, although a woman's failure to attain orgasm may cause disappointment to herself or to her husband, it is not likely to cause her strain or illness unless a high pitch of erotic tension has regularly been reached. But where this is the case, symptoms of anxiety neurosis are almost certain to be found, and the matter should be fully discussed.

Types of Functional Derangement

In women, disorders of the sexual function occur mainly as disturbances of feeling. The female generative tract is by far the most "hysterical" organ of the body, being subject throughout its length to anaesthesias, hyperaesthesias, paraesthesias, hypertonus and hypotonus, and hyper- and hypo-secretion. Of these, anaesthesia is much the commonest disturbance and, unfortunately, much less amenable to therapy than the other dysfunctions. It can affect either the vagina or the clitoris, or both. The distribution is comparable to the "glove and stocking" variety of hysterical anaesthesia: if the vagina only is involved it starts precisely at the introitus. Usually the repression of feeling interferes with the capacity for orgasm, but sometimes the orgasm is not totally lacking but is lessened in intensity. If anaesthesia is complete the woman will have no knowledge whatever of erotic sensation. Even in such cases the inhibition occasionally lessens in sleep, when the mental censorship is less active, and the woman may wake with erotic feeling or even with orgasm. Occurrences of this sort are by no means uncommon, and show without doubt that, although women may suffer permanently with anaesthesia, the capacity for feeling is still present, but is repressed. A chance reshuffle of the unconscious inhibiting forces, as so often occurs in dreams, can sometimes allow normal erotic feeling to be liberated. It may be only an occurrence of this sort which causes a woman to realize that her sexual feeling is usually inadequate.

Hyperaesthesia of the clitoris and vulva is a disability commonly associated with true frigidity; often the woman feels unable to accept a sexual relationship at all. Hyperaesthesia of the vagina is more curable, even though it always induces vaginismus.

Disorders of muscle tone are general gynaecological problems; the only condition which needs description here is vaginismus—a hypertonus of the muscles of vagina and pelvic floor which invariably causes dyspareunia.

When disabilities of this sort are persistent they must be classed as hysterical conversion symptoms. In common with tics, stammers, and so on, they have their roots in early childhood. It is said that on analysis such

symptoms prove to be manifestations of early wishes which were conscious once and perhaps in harmony then with the conscience, or which at that time solved some intolerable conflict. Occasionally the patient's attitude towards her symptom suggests its meaning. For instance, a woman with complete genital anaesthesia may be quite unaware of the vulva and vagina; her denial seems to imply, "There is no sexual organ at all—there can be no sexual feeling there." Hyperaesthesia of the vulva often suggests the attitude, "It is too fragile, too dangerous to be touched," and the hyperaesthesia of vaginismus, with its common accompaniment of anger, undoubtedly represents "I will not be penetrated. You shall not touch me. It cannot be done."

These sexual derangements are sometimes intermittent, and with experience and under favourable conditions they may resolve spontaneously. With the exception of vaginismus, they are not very accessible to effort by the patient or to advice by the doctor; and unless analytic treatment is necessary or feasible their presence may need to be accepted by all concerned. Most disabilities therefore should not be emphasized either to a woman or to her husband. These psychical patterns must surely be accepted as part of a woman's total personality: their presence need be neither more nor less open to criticism than that of any other personal characteristic.

The aetiological factors of anxiety hysteria and its conversion symptoms are obscure and fall into the domain of the psychiatrist rather than of the gynaecologist. Briefly, there seems much evidence that in early infancy erotic sensation of a type is universally experienced. This tension inevitably creates discomforts and guilts and therefore tends to undergo repression during early childhood. As development proceeds, the sexual responsiveness of every individual is liable to be affected by anxieties, conflicts, fixations, repressions, and inhibitions which can manifest themselves in an endless diversity of hysterical symptoms.

When functional sexual disorders are secondary to adult events they are much more likely to resolve. Thus transient anaesthesia, vaginismus, or frigidity can be based on resentment or on loss of affection. Sometimes a fear of pregnancy, or disappointment caused by failure to conceive, evokes a frigidity; and a certain knowledge that husband or wife is sterile may do likewise—an important point in these days of salpingography and seminal analyses.

Hysterical symptoms of this sort must not be confused with those of anxiety neurosis, which will be described later, and with which they are sometimes associated. Anxiety neurosis is of greater clinical moment, for it is associated with ill-health which can often be medically relieved. There the somatic symptoms may be multiple and are merely expressions of pent-up frustration, each individual responding to stress after his own autonomic fashion. The hysterical symptom, on the other hand, is usually single, often permanent, and represents a definite emotional idea. It is not influenced by medicine, although alcohol may sometimes go a little way to lessen its intensity.

Common Functional Disorders

Lack of space limits the description of sexual derangements to four only.

Vaginal Anaesthesia

This is by far the commonest sexual disorder in women and the one about which advice is most often sought. It varies in degree and persistence. In most cases the woman is capable of a little sensation, generally not sufficient to give rise to vaginal orgasm; in others the anaesthesia is complete and permanent. Many women who suffer from this disability have no idea that there is anything amiss, nor have their husbands. Those who are capable of achieving clitoral orgasm, and whose husbands are competent to give it to them, may be entirely satisfied with their sexual relations. Others who have been criticized for their disability may feel in despair about it. It is difficult in many ways to prophesy the outcome of a vaginal anaesthesia. It is common in newly married women and may resolve; but in an experienced woman who has borne children yet has never known erotic vaginal feeling the chances that resolution may not occur are considerable. Such a woman will not usually suffer from frustration if her husband withdraws or is precipitate or impotent: on the other hand, it may not be fair to judge her ability for orgasm if the husband is invariably inadequate: a well-sustained coitus undoubtedly helps a woman to achieve her full capacities.

Fortunately, women handicapped in this way may be quite satisfactory as sexual partners; if they are emotionally receptive, tumescence occurs readily and they may enjoy their sexual intimacy. Indeed, it is said that many successful prostitutes are women who suffer from a total genital anaesthesia.

Inhibition of Orgasm

In another vaginal neurosis, much less common than anaesthesia but of greater medical significance, erotic sensation is experienced to the full, but the inhibition is so timed that it just prevents the attainment of any orgasm. Women with this disorder may suffer also from a sudden drying up of vaginal moisture; one described it "as though her throat went dry with fear." In some of these women desire tends to die down in spite of continued stimulation, but others are left quite unsatisfied and with a most exhausting frustration. To them, coitus usually brings sleeplessness and depression, followed by an aching back and pelvis the next day. These women invariably suffer from symptoms of anxiety neurosis and are sometimes positively ill in the early part of their marriages. They can present real problems in diagnosis, and it is important that their disability should be recognized for what it is. Commonly their situation has been made worse because neither they nor their husbands understand what is amiss. Such a woman nearly always complains to the physician that the fault must lie with her husband, or that she fears she has married the wrong man. But in fact her history can readily be sorted out from those who have a slight vaginal anaesthesia, or who lack orgasm on account of their husband's incompetence. These last, if there is no true inhibition, will almost certainly have achieved orgasm occasionally, either during their sexual intimacies or at other times in their lives.

Inhibition of orgasm is generally present from the beginning of marriage. Rarely, it develops in women who have previously appeared normal, or occasionally the condition is intermittent. Unfortunately, women with this disorder seem unable to cure themselves. In my experience the end-result (other than in those who have been relieved by psychotherapy) is that a secondary frigidity is imposed which is often accompanied by an extreme distaste for sexual relations. Such women suffer from psychosomatic illnesses, and their future in

marriage is not likely to be very happy. If the physician cannot, for practical reasons, recommend psychotherapy, he should do his best to explain that the handicap is intrinsic, is not dependent on the husband, and that the woman would almost certainly carry it with her even if she sought to change her sexual partner. It is unkind not to stress this point, for these women sometimes make fruitless experiments hoping for better results. Childbearing early in marriage, though it does not cure the disability, often relieves the acute stress. This may be a sensible palliative to advise.

Vaginismus

Lack of space prevents a full description of hysterical vaginismus. In this disorder the spasm may be severe enough to prevent penetration entirely, or more often to cause discomfort, sometimes to the husband as well as to the wife. Women with extreme degrees of vaginismus often reach the divorce court for annulment of marriage. Minor degrees are very common. Sometimes, but by no means always, there is a lack of orgasmic ability: clitoral response is usually unimpaired, and occasionally the woman may have such urgent vaginal desire that her self-induced frustration causes her acute strain. In vaginismus the spasm is caused by an active unconscious fear, and the syndrome is protective. In about a third of cases a direct history of "conditioning" in infancy can be found; usually the trauma was due to the painful insertion of anal soap-sticks, sometimes to enemata or to catheterization. The earlier such traumata occur the more indelible the fear of "penetration" appears to be. Other cases have a history of some sexual affront, perhaps from an exhibitionist, in later childhood. Where no history can be found, analysis is said to reveal an attitude of fear which has been built up from childhood, often relating to stories about the pain of defloration or of childbirth, or to infantile memories of parental coitus. In passing, it might be said that nearly all cases are open to persuasion, and will learn to accept penetration provided this is received with the back, knees, and hips in the fullest flexion.*

Non-acceptance of Clitoral Orgasm

This can hardly be called a functional disorder, but clinically the condition is so important that it demands description. A large proportion of women who cannot get vaginal orgasm can get clitoral relief provided they permit their husbands to give them digital stimulation. There has been much textbook discussion on coital positions which permit clitoral stimulation, and doubtless in quadrupeds the clitoris is designed for stimulation in this way. In most women, however, coital movement is inadequate to produce a clitoral response. The amount of prejudice that invests this topic is hardly less than the amount of sexual suffering and ill-health which the taboo causes. The belief that clitoral touch is shameful springs largely from the austerities of Victorian nursery training. Being inculcated at such a tender age, the doctrine dies hard. This fear (usually rationalized as "dislike") often deprives women of their normal sexual release. The practitioner should specifically inquire whether the woman gets satisfaction from inside the passage during coitus or from preliminary clitoral stimulation. This will give a patient the chance to discuss her difficulties or those of her husband.

*I have described the treatment of vaginismus fully in the *British Medical Journal*, 1942, **2**, 213.

Medical Results of these Disturbances

Anxiety Neurosis

It is common knowledge that sexual disorders can cause nervous ill-health. Some people have little tolerance of frustration and quickly become unwell.

Anxiety neurosis was first described as a condition which occurs when the libidinal excitation is greater than the libidinal discharge. The surplus libido then manifests itself as "free-floating anxiety." In the sexual sphere it is well recognized that *the greater the amount of stimulation the greater will be the strain of a missed climax*, and this is true whether the orgasm is prevented by intrinsic or by extrinsic factors. The psychosomatic symptoms which can then appear are legion: depression, irritability, and morbid anxiety are common emotional disorders; the physical ones are expressed by autonomic disturbances, and sometimes appear dramatically, like an illness. Thus a newly married woman experiencing frustration may suddenly lose weight, suffer from great fatigue, headaches, cardiac and gastric disorders, tremor, sweating, and so on. Between her tears she may assert that she is perfectly happy, which is usually true. If the condition has lasted for months or years the severity of the symptoms will have abated, but some chronic functional derangement can usually be detected.

Reflex Congestion

When pelvic organs repeatedly reach a state of tumescence but orgasm—and therefore decongestion—does not follow, symptoms of chronic pelvic congestion will develop. Congested ovaries are apt to be exceedingly tender and to cause reflex backache, dyspareunia, pain on defaecation, and general malaise. Menorrhagia, leucorrhoea, and frequency of micturition are commonly found too.

As a rule, some degree of protection develops in the form of a secondary frigidity. This prevents the repeated occurrence of tumescence, although it brings with it considerable neurotic ill-health. Classical cases of this sort are less often seen now that coitus interruptus has fallen into general disrepute.

Therapeutic Application

The causes of sexual frustration are conveniently classed as extrinsic and intrinsic. Only when the diagnosis is quite clear is sound advice likely to be given.

Extrinsic Causes

1. If a woman is capable of vaginal orgasm, but before she reaches it her husband either withdraws, is precipitate, or is impotent, she will ultimately suffer from severe frustration. Such interruptions do not usually disturb a woman who is frigid or who has vaginal anaesthesia. It is important to make this clinical distinction, for a woman of the latter type may be very well mated to a husband who brings these disabilities. Where withdrawal has been practised it is easy to arrange for a better contraceptive method; but where the husband's difficulties cannot be overcome the wife will have to adapt as best she can. She will be fortunate if she can get a clitoral orgasm to compensate her.

2. Great frustration can be caused when a woman who cannot get a vaginal orgasm deprives herself of the relief of a clitoral one. Sometimes a woman barely knows that she has the latent capacity to respond to clitoral

stimulation; or sometimes she desires it but doubts the propriety of her wishes. If the husband also has been restricted by his cultural training her sexual frustration may be complete. It is very easy for the clinician to overlook confusions of this sort, for some women deliberately evade admitting to a desire which they feel to be "all wrong" or "not natural." In such cases considerable persistence is needed to extract the true history. Even then, verbal reassurance may be inadequate: it may be best to recommend books, and in some cases advice on these subjects by clerical writers is particularly successful. A little sensible information on the matter can make a tremendous difference to some women.

Intrinsic Causes

1. Most serious of these is the condition already described, where there is only an inhibition of orgasm, not of erotic feeling. The treatment of choice is essentially psychotherapeutic; and a search for the inhibiting factors is sometimes successful. Where this is impossible the woman should be advised to cease trying to attain orgasm and to allow herself to be as little stimulated by coitus as possible; she can be given a quickly working sedative such as chloral to induce sleep immediately after coitus. In most anxiety states small doses of phenobarbitone, valerian, or bromide are useful too. Wherever possible, new interests and creative activities should be encouraged, so that the pent-up libido can find other channels of release. Even though childbearing usually brings relief it may be unwise to advise it if the woman is already nervously ill. Women with this disorder may be better off as celibates, but this can hardly be advised if the marriage is to hold.

2. Occasionally a phase of frustration may occur in a woman whose vaginal anaesthesia is beginning to resolve, either spontaneously or with psychotherapeutic treatment. As her erotic desire gets nearly free enough to reach orgasm considerable nervous strain may be experienced. The condition is transitional, and should be explained to her.

3. Rarely, patients complain of unaccountable erotic desire; for instance, the wearing of a Hodge pessary may begin to cause orgasm, and so on. This is suggestive of incipient psychosis, and should there be other questionable symptoms an early psychiatric opinion is desirable.

4. "Holding back"—a deliberate suppression of orgasm—is practised by women who mistakenly believe that pregnancy can be avoided if an orgasm is not permitted. This pathetic hope is so widely held among uneducated women that sometimes a change of contraceptive method is advised for the husband yet inadvertently the wife is left practising this method as an additional precaution. The practice is invariably detrimental to health. Correct information should be given.

It is possible for women in categories other than these to experience sexual strain; but they do so less often, and do not usually require medical intervention. There are three invaluable rules in work on these subjects: to advise lubrication of the vagina with a water-soluble jelly (Prentif jelly, Lilly's lubricant, etc., but not petroleum jelly), to teach relaxation of the introitus by lying in flexion, and to advise the acceptance of clitoral orgasm if for any reason vaginal orgasm is unobtainable. But when frustration cannot be avoided, both partners should be given an explanation, and be told that symptoms of strain are likely, in time, to become less intense. In a case of anxiety neurosis the physician should always supervise, because such patients are liable to go into a "nervous breakdown" without anyone being aware of what is happening.

Clinical Points

Disorders of this sort probably come the way of most practitioners, and clinical acumen usually suffices in giving help. Nevertheless, confusions about vaginal anaesthesia are very common, particularly in its relationship to contraceptive practices. Such women should not be urged to improve their contraceptive technique solely with a view to curing this sexual disability: disappointment is bound to ensue. The outline given above is therefore designed to fill in certain points which are not universally understood, and the classification offered is emphatically clinical, not academic. I should like to illustrate this by quoting a recent hospital case.

A multipara in the middle thirties had reached the orthopaedic department with the complaint of continuous low backache. Thence she was referred to the gynaecological out-patient department, where the pelvis also was found to be normal, but where it was discovered that her husband was practising withdrawal and that she was failing to get orgasm. At the contraceptive clinic, however, she averred no coital frustration at all, but finally admitted to clitoral tension, which she believed to be quite shameful. A fortnight after instruction she returned to report that clitoral orgasm was established and her backache had gone.

Unfortunately, out-patient departments are not very suitable for the discussion of these intimate matters. Since medical leisure and privacy are at a premium it is difficult to see how morbidity of this sort is usually to receive attention. There is also a real need for some mention of these matters in the medical curriculum.

Practitioners interested in this work develop a technique for getting salient information in the least possible time. Since most women know little about their sexual reactions and are disposed to admit even less, the practitioner must usually go more than half-way to help. Where, for instance, gynaecological symptoms suggest a pelvic congestion or where complaints of unaccountable anxiety are made, he can ask, "Is it possible that you are not getting your sexual satisfaction properly?" When questioning, particular allowances must be made for the fact that a patient with a sexual disability may be too inhibited to appreciate its existence; more often, perhaps, she is too confused to be able to speak of difficulties which she vaguely senses. It is not surprising that a woman who has never learned words in which to describe the sexual act, or has never even experienced normal coitus, fails in explaining, say, that her husband is too precipitate for her to get a vaginal response; or that she has clitoral desire only, vaginal feeling being unknown to her; or that she is too dry, or has too tight a vaginal spasm for her husband to effect penetration. Therefore, in questioning, the practitioner should make sure that at the same time he is offering the patient suitable terms in which to describe her difficulty. Even though his expressions may need to be worded very simply for an uneducated woman, questions of this sort—provided they are straightforward enough for a nervous patient to understand—will seldom, if ever, be resented.

PATHOLOGICAL EXAMINATION OF NINE CASES OF RETROLENTAL FIBROPLASIA

BY

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Retrolental fibroplasia is an apparently new disease affecting the eyes of premature babies of low birth weight, commonly occurring bilaterally, and developing during the first six months of life in eyes which were normal at birth. The possibility that the increased survival rate of premature babies might account for the increased incidence of the disease has been considered. In the United States the statistics of Kinsey and Zacharias (1949) and of Gilger (1949) show that the increased survival rate cannot be accepted as a complete explanation. Terry (1942, 1943, 1945) was the first man to appreciate this disease as an entity, and his work has stimulated a great interest in the condition in the United States, where a large number of publications have appeared. In the United Kingdom, an extensive review of the literature is given by Cross (1950), but the only pathological study so far is that of Wolff (1950).

The fully developed disease is characterized by a total retinal detachment, the development of a fibro-vascular membrane behind the lens, and, later, by signs of a low-grade inflammation in the anterior half of the eye. The clinical and pathological interest of the disease is that eyes may be removed on the basis of a diagnosis of retinoblastoma. Retrolental fibroplasia constitutes one variety of pseudoglioma, the combination of the history with the characteristic histological appearance enabling it to be separated from the other members of the group.

Present Series

We have examined nine eyes in which we made the histological diagnosis of retrolental fibroplasia, and we describe below the various features which these eyes show in differing degrees and on which we based our opinion. Bad fixation of one of the eyes made the histological details difficult to interpret, but it is included in the series because a diagnosis was possible when the histology was considered together with the clinical history. The Table gives brief details of the cases.

Case No.	Birth Weight	Gestation	Eyes Affected	Age at Enucleation
	lb. oz. kg.			
1	2 3 0·99	28 wk.	Both	24 months
2	2 9 1·16	32 ,,	,,	5 ,,
3	2 10 1·19	Uncertain	,,	6 ,,
4	2 13 1·27	32 wk.	,,	4 ,,
5	3 3 1·45	27 ,,	,,	9 ,,
6	3 4½ 1·49	33 ,,	R. only*	6 ,,
7	3 9 1·62	30 ,,	Both	8 ,,
8	3 10 1·64	33 ,,	,,	16 ,,
9	4 14 2·21	36 ,,	,,	5 ,,

* Early signs of the disease were present in the left eye, but have since regressed.

The retrolental membrane is formed of vascular connective tissue (Fig. 1). In all our cases this membrane was attached to the epithelium of the anterior part of the pars plana, or as far forward as the ciliary processes.

FIG. 1.—The fibro-vascular retrolental membrane (Case 2.)

This connexion is occasionally very clear, and the non-pigmented cells of the ciliary epithelium invade the connective tissue for some distance (Fig. 2). The fibroblasts and newly formed capillaries give the appearance of an inflammatory reaction, although inflammatory cells are not an outstanding feature of the membrane.

The retina in every case was completely detached and greatly folded, lying immediately behind and attached to the membrane which separated it from the lens. In each case the detached retina extended peripherally to the pars plana, or even further forward, a separation between the inner clear cells and the pigment cells anterior to the ora serrata having occurred. Fig. 3 shows

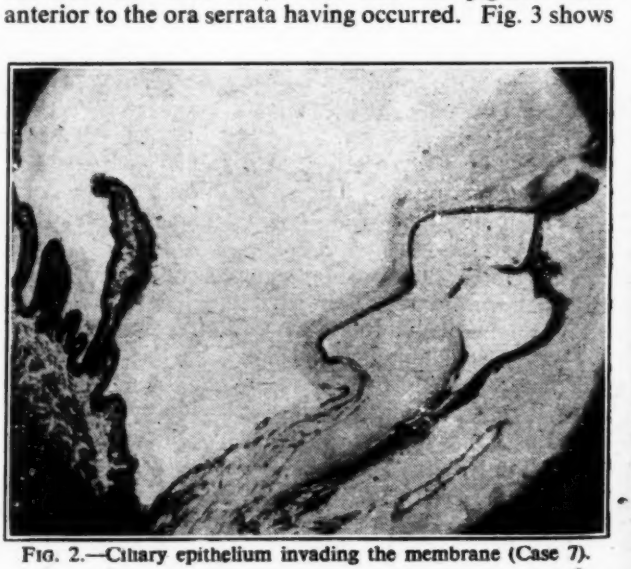

FIG. 2.—Ciliary epithelium invading the membrane (Case 7).

FIG. 3.—Retinal detachment extending up to the ciliary body. Proliferation of clear cells of ciliary epithelium (Case 2).

the retinal detachment extending up to the ciliary body, and another section (Fig. 4) shows the separation occurring in the pars plana between the clear cells and the proliferating pigment cells. Retroretinal inflammatory changes may occur, however, and obscure this relationship between the pigment layer and the clear cells of the ciliary region.

All the cases showed a separation in some degree, but they also showed a partial reunion of the other retinal layers with proliferating pigment cells, and a formation of strands of connective tissue in the angle between these cells and the detached retina. In two cases there was a distinct separation to one side of the section, but to the other side a reunion had occurred as the result of proliferative changes. The considerable folding of the retina made it difficult to decide whether it was fully differentiated before detachment occurred.

FIG. 4.—Separation between the clear cells and the proliferating pigment cells (Case 5).

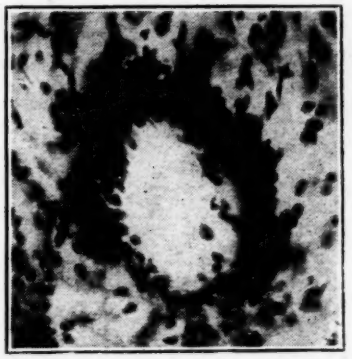

FIG. 5.—Rosette in the detached retina (Case 1).

Rosettes (Fig. 5) were fairly common, but there were areas in which all layers of the retina could be made out. It is possible that the finding of rosettes in the thickened, detached retina might give the impression that we were dealing with a retinoblastoma, especially if retinal differentiation was poor. We saw, however, nothing suggestive of the characteristic areas of degeneration found in retinoblastoma. Haemorrhages and exudates were present in the folded retina in six of the cases, and in two of these the haemorrhages were particularly large. Blood vessels of the retina may connect with the membrane (Fig. 6), and, in addition to this vascular connexion, glial fingers may penetrate the membrane from a glial hyperplasia on the front of the retina (Fig. 7).

Every case showed an exudate between the retinal pigment epithelium and the other retinal layers. In this exudate a common feature was the presence of numerous "ghost" cells (Fig. 8), which in one case invaded the retina itself. The origin of these cells is uncertain, but they are probably derived from the retinal pigment epithelium (Lamb, 1938), which shows a tendency to proliferate. These "ghost" cells are, of course,

FIG. 6.—Vascular connexion between retina and retrolental membrane (Case 6).

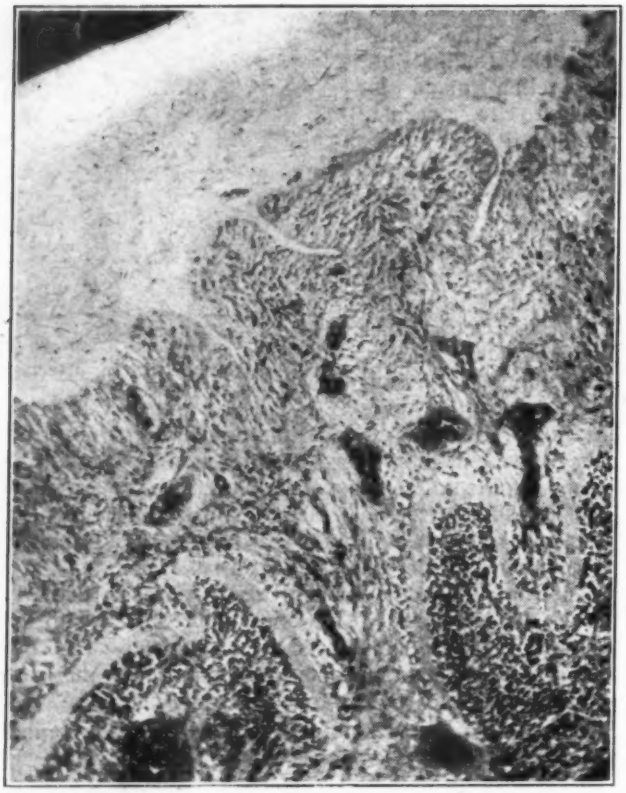

FIG. 7.—Glial hyperplasia on the surface of the retina (Case 6).

not peculiar to the condition of retrolental fibroplasia but occur in many retinal inflammatory and degenerative diseases. The signs of irritation in the anterior part of the eye are also not specific, and occur late in the disease. Irritative inflammation of the iris leads to adhesion between iris and lens, and the periphery of the anterior chamber is often obliterated, apparently owing to the lens and the iris being pushed forward by the mass of tissue behind them. In one case Descemet's membrane showed a split where the iris had been adherent to the cornea; only two cases had no pathological changes in the anterior chamber.

Aetiology

It has only been possible to examine eyes excised in the late stage of the disease, and in our series of cases no single pathological sign demonstrated how the disease may start. Wolff (1950) believes that a failure of coaptation of the two layers of the optic cup at about the third month of intrauterine life leads to a quiet cyclitis and the development of a retrolental cyclitic membrane. Examination of these eyes would support Wolff's contention that the retinal detachment extends beyond the ora serrata, our evidence being the frequent separation between the pigmented and clear cells of the ciliary epithelium. We think, however, that retroretinal inflammatory changes are not so rare as Wolff suggests. Klien (1949) thinks that angioblastic tissue may invade the retina and prevent its proper development, or that a normally developed retina may be detached owing to traction by such angiomatous tissue within remains of the vitreous. What constitutes angiomatous tissue is difficult to define, but we found no new vessel formation which could not be explained as a simple reaction to some irritation. None of the patients had naevus formation elsewhere in the body.

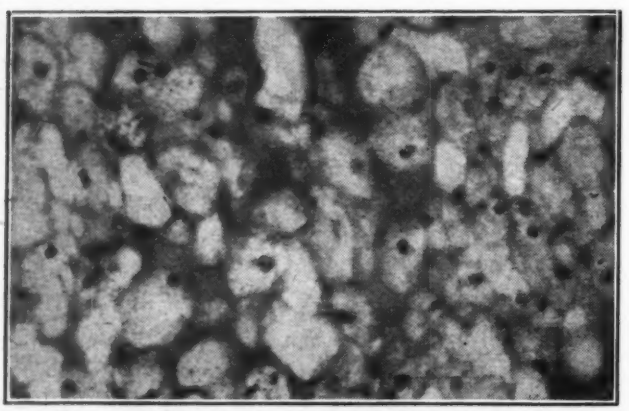

FIG. 8.—"Ghost" cells in subretinal exudate (Case 6).

Reese and Blodi (1951) also concluded that retrolental fibroplasia represents the eye manifestation of a generalized congenital angioplastic process. Their pathological material is particularly interesting, because the eyes show the early stage of the disease. One patient was one of twins, weighed 2 lb. 14 oz. (1.3 kg.) at birth, and died when 11 weeks old. Retrolental fibroplasia had been diagnosed at 8 weeks. The other twin lived and developed the disease in both eyes. The sections Reese and Blodi described showed vascular budding from the inner surface of the retina and much new vessel formation in the vitreous. There were also haemangiomata of the right orbit, the choroid plexus of the fourth ventricle, the carotid body, and the cervical region of the pharynx. From their examination of the material they concluded that an angioplastic process of the vitreous is the characteristic feature of the disease. It seems equally possible, however, that a haemorrhage from the retina or exudation into the vitreous could lead to new vessel formation of this kind, in the same way as occurs in the development of retinitis proliferans.

Minton and Cole (1951) reported two cases of retrolental fibroplasia with pathological details of one of these, that of a full-term infant in which the eye disease was accompanied by multiple congenital deformities—congenital encephalo-ophthalmic dysplasia (Krause, 1946). Previous authors (Reese and Blodi, 1950, 1951; Parker Heath, 1950) have tended to separate this syndrome from the retrolental fibroplasia of prematurity, and on the clinical and pathological evidence available we consider it hardly justifiable to regard Minton and Cole's first case as one of retrolental fibroplasia.

A congenital condition with which retrolental fibroplasia should not be confused is a persistent posterior vascular sheath of the lens, which is usually unilateral, present at birth, and not accompanied by a detachment of the retina. Terry (1942, 1943, 1945) thought that a fibroplastic overgrowth of a vascular sheath of the lens persisting in premature infants was the cause of retrolental fibroplasia.

Conclusion

We believe that an exudative process occurring in the retina or choroid could produce a serous detachment of the retina and vitreous opacity, with the subsequent development of a cyclitic membrane and total retinal detachment. This view is advanced only after considering the histological evidence in conjunction with clinical observations, and histological examination of eyes in an early stage of the condition is necessary before the aetiology can be determined. We are examining the

eyes of stillborn infants and of those dying in the early weeks of life, and hope that this will throw some light on the problem.

Summary

Histological appearances of nine eyes enucleated in the late stage of retrolental fibroplasia are described.

It is considered that the condition is inflammatory in origin, but the cause of the irritation cannot be deduced from the histology.

We are grateful to the surgeons of the Oxford Eye Hospital for permission to use the histories of cases under their charge.

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A CASE OF POLYARTERITIS NODOSA TREATED WITH CORTISONE

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The following case of polyarteritis nodosa is reported in order to demonstrate that cortisone can heal the characteristic lesions, and to show that the use of the drug in the later stages of the disease may have undesired sequelae.

Case Report

A male shop assistant aged 47 was referred to Professor Henry Moore in November, 1950, by Dr. Michael Kelleher, for investigation of persistent leg pain. The family history was no help, but the previous personal history was one of sporadic illnesses since 1945.

In 1945 his right maxillary antrum was drained, and two weeks later he developed joint stiffness, which was diagnosed as "rheumatic fever." These joint symptoms persisted for several weeks. Some weeks later he developed a chest complaint which was diagnosed as "pneumonia."

No information regarding treatment during this period could be obtained. Special attention was directed to the question of sulphonamide therapy because of the possibility that there may be some connexion between polyarteritis nodosa and the sulphonamides. It seems probable that the patient did receive these drugs, but we have been unable to obtain definite information on this point.

From the end of 1945 he had no definite ailments, but there was a gradual loss of weight until July, 1950, when he began to suffer from loss of energy, night sweats, and a productive cough. Later he developed pain in a small area of the right calf, which gradually became more severe and spread over the entire calf. A similar pain then began in the left calf.

On admission clinical examination was unrewarding; observation showed an evening pyrexia. The latter, together with the loss of energy and of weight and the occurrence of night sweats, suggested a diagnosis of phthisis. This was not substantiated by a radiograph.

The blood pressure was normal. The urine contained a moderate quantity of albumin, a few granular casts, and a few red cells. The urinary findings were constant on repeated examination. The blood urea was 51 mg. per 100 ml. Total and differential white cell counts were normal. The Widal reaction and blood culture were negative.

Renal tuberculosis was then considered, but no tubercle bacilli were demonstrated on repeated examination of the urine, and excretion urography was normal.

Over a period of seven days the leg pains became more intense; the upper limbs also became painful and the patient complained of marked weakness. The following abnormal nervous signs were noted: (1) In the upper limbs there was generalized wasting and weakness consistent with the poor physical health. (2) In the right hand there was paralysis of the thenar muscles with complete loss of power in the opponens pollicis and the abductor pollicis brevis. Perception of pin-prick and light touch was lost over the entire volar surface of the thumb and first two fingers and over the distal third of the dorsal surface. (3) On the left forearm along the medial border was an oval area extending from elbow to wrist where pin-prick and light touch were not appreciated. The patient complained of numbness in this area. (4) The deep reflexes were present and equal in both upper limbs. (5) The superficial abdominal reflexes were absent on the right side but present on the left. (6) Both lower limbs were markedly wasted, and weakness was considerable. Pin-prick and light touch were lost over the lateral aspect of the right calf and dorsum of the foot. Postural sense was absent in the right great toe and was impaired in the left. All deep reflexes were absent, and the right plantar response was doubtfully extensor.

The overall picture was that of an asymmetrical polyneuritis involving the lower limbs, with median neuritis of the right hand and a lesion of the left medial cutaneous nerve of the forearm.

The picture of widespread nervous disorder associated with pyrexia and abnormal urinary findings suggested the possibility of polyarteritis nodosa. Eosinophil counts were carried out every four or five days, and a daily search was made for peripheral arterial nodes. The earlier eosinophil counts were below 300 per c.mm., but on the 18th day in hospital the count rose to 3,450 per c.mm. This was regarded as strong collateral evidence in favour of the suspected diagnosis. On the 28th day subcutaneous nodes were found in the left upper arm. One node was removed from a superficial branch of the left brachial artery (by Mr. P. Carey). The pathological report confirmed the diagnosis.

On the same day the patient developed a subarachnoid haemorrhage (presumably due to rupture of an intracranial node) and had multiple epileptiform attacks. At this stage cortisone treatment was under active consideration, but was rejected because of shortage of supplies. Later the relatives procured some "cortone" from America and treatment was begun on the 50th day, when the patient's condition was grave. The drug was administered by deep intramuscular injection in single daily doses of 200 mg. for four days followed by 100 mg. for six days—a total of 1.4 g. in 10 days. At the end of this period, 60 days after his admission to hospital, the patient died.

In the terminal stages full neurological examination was repeated and more widespread nervous damage was noted as follows. The patient complained of severe continuous paraesthesia in his hands and feet. The cranial nerves were still normal. The upper limbs were markedly wasted, and

weakness was so intense that small objects could not be held in the hand. All sensation was grossly impaired in both forearms, and all deep reflexes were absent. Both lower limbs were wasted; bilateral foot-drop and trophic changes in the skin of the feet were observed. There was a flaccid paraplegia with gross impairment of superficial and deep sensation below the knees. All deep reflexes in the lower limbs were absent and the plantar response could not be elicited owing to the widespread motor and sensory changes. The clinical condition was now an advanced polyneuritis.

During the last few days of life scattered petechiae appeared in the skin and multiple small haemoptyses occurred. Involvement of mesenteric vessels was suspected because there occurred considerable abdominal pain, rigidity of the abdominal wall, and vomiting. The ultimate cause of death was renal failure—on the 30th day in hospital the urea clearance figure was 30 and the blood urea rose continuously to the final recorded figure of 216 mg. per 100 ml. At no time were changes noted in the electrocardiogram, and at repeated examinations the eyegrounds were normal.

Pathological Findings.—The biopsy specimen received for examination was a small piece of subcutaneous fibro-

FIG. 1.—Lesion in subcutaneous tissue of forearm before administration of cortisone. (Biopsy material. ×30.)

lipomatous tissue. On histological examination a small artery was seen in the specimen. The vessel showed fibrinoid necrosis and marked periarterial infiltration by polymorphs and lymphocytes (Fig. 1). The lesion was typical of polyarteritis nodosa in the acute phase.

Necropsy Findings

A small haemorrhage was present in the occipital pole of the right cerebral hemisphere (brain, 1,550 g.).

Both lungs (right 1,130 g., left 1,020 g.) showed congestion and oedema of the lower lobes. A small area of pleural thickening was present at the apex of the left upper lobe. A thin layer of healed tuberculous scar tissue was present at both apices. A number of small infarcts were visible. These were most numerous in the right lung and in the lower lobe of the left lung. A slight degree of acute fibrinous pericarditis was present. The heart (380 g.) appeared normal. The aorta showed a minimal degree of atheroma.

Extensive superficial erosions of the mucosa of the oesophagus were present. The gastric mucosa was atrophic and showed almost complete absence of rugae. The mucosa of the small intestine appeared normal. Numerous small white fibrous nodules (1 to 2 mm.) were visible on the smaller branches of the mesenteric arteries and of the arteries to the omenta. A major jejunal branch of the superior mesenteric artery was thrombosed.

The surface of the liver (1,090 g.) was markedly granular. The cut surface showed the typical "nutmeg" mottling of advanced venous congestion. The spleen (95 g.) was small and firm but appeared normal. Both kidneys (right 142 g., left 120 g.) were pale. The capsules stripped easily, leaving a finely granular surface. On section the cortico-medullary demarcation was clear. The normal striations were lost. A fine greyish mottling of the cortex was present, but the glomeruli were not especially prominent. Running from the pyramids to the periphery there were several small sharply defined white infarcts. The suprarenal glands (right 3.8 g., left 4.2 g.) were normal in size and appearance.

Histology

Fibrinoid necrosis of small arteries, associated with periarterial fibrosis and in many cases partial or complete obliteration of the lumen of the vessel by newly formed fibrous tissue, was very extensive (Fig. 2). Lesions of this

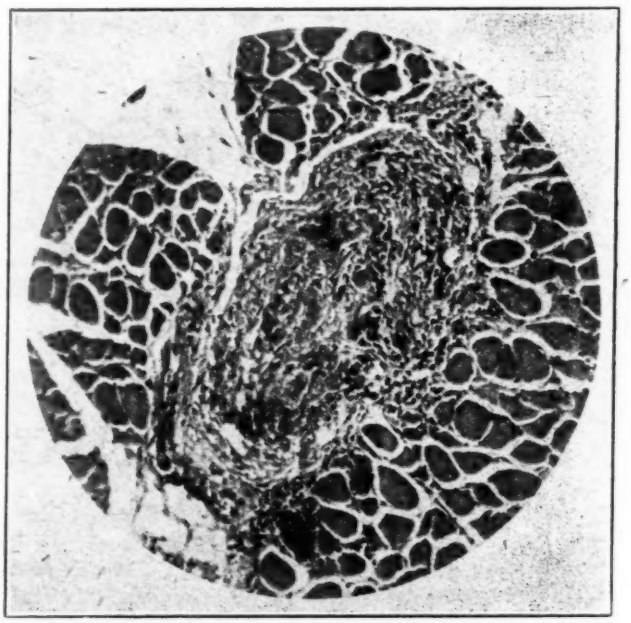

FIG. 2.—Lesion in biceps muscle after administration of cortisone. (Necropsy material. ×60.)

type were widespread in the voluntary muscles, the lungs, the liver, the mesentery, and the kidneys.

Frequently fibrosis had progressed to such an extent that the only indication of an artery being involved was the presence of a ring of deeply eosinophilic hyaline material in a fibrous nodule, this ring representing the original arterial wall. Inflammatory cells were not present in these lesions. Detailed search failed to reveal any lesion comparable to the acute phase polyarteritic lesion found in the biopsy specimen.

Thrombosis of the medium-sized arteries was also of widespread occurrence. Collections of polymorphs were frequent in the lumina of the thrombosed vessels but not in the perivascular tissue.

The lungs showed leucocytic infiltration of the alveoli near the infarcted areas. Central zonal congestion of the liver was marked. The kidneys showed a necrotizing glomerulitis with fibrinoid necrosis of the tufts. The glomerular lesion was of irregular distribution, many glomeruli appearing normal. Degeneration of the tubular epithelium and oedema and cellular infiltration of the interstitial tissue were marked. Many tubules contained collections of leucocytes. Venous congestion both of the kidneys and of the suprarenal glands was prominent.

Discussion

To us the most interesting features of this case are the neurological findings and the effect of cortisone. The neurological findings noted at the first examination are well expressed by the term "mononeuritis multiplex," which was introduced by Lovshin and Kernohan (1949), who recorded such findings in eight cases. These manifestations, when present, are very suggestive of polyarteritis nodosa, particularly if there be pyrexia and signs suggesting dysfunction of other organs or systems. The findings at the second examination were those of an advanced polyneuritis, and indicate the necessity of considering polyarteritis nodosa in all cases of peripheral neuritis.

Histological examination of the necropsy material demonstrates the absence of an inflammatory infiltration around the areas of fibrinoid necrosis in the smaller arteries. When considered in relation to the intense perivascular inflammatory infiltration present in the biopsy specimen obtained 32 days before death it seems justifiable to regard the change as due to cortisone. This is in accordance with the findings of Shick, Baggenstoss, and Polley (1950), who treated three cases with cortisone. Two patients died in cardiac and renal failure in spite of initial improvement. Necropsy showed complete healing of all arterial lesions, but with the process of healing fibrous obliteration of the lumen of the vessels had occurred with widespread visceral infarction.

It is therefore evident that cortisone can be a two-edged weapon. If it eventually proves to be of value in the treatment of polyarteritis nodosa it will be of great importance to begin treatment at such an early stage that healing of affected vessels will not provoke serious visceral infarction. In consequence the early diagnosis of polyarteritis nodosa is desirable so that the effect of cortisone given at the onset of the disease can be investigated. As can be seen from the present and other recorded cases, this, in spite of a high index of suspicion, may be extremely difficult.

We wish to thank Professor Henry Moore for permission to publish this case.

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The U.S. Army medical service, in co-operation with the U.S. Department of Agriculture, has developed and is now using in Korea new insecticidal formulations capable of controlling Korean body lice which are resistant to D.D.T. These are preparations of lindane and pyrethrum louse powder which are highly effective against the Korean louse and have been tested and declared safe for human use by the Army Environmental Health Laboratory, Edgewood, Maryland. Army medical personnel will soon begin mass dusting of P.O.W.s with 100,000 lb. of lindane, which was shipped to Korea early this month. One million pounds of equally effective pyrethrum powder have been procured and will be put in use upon arrival in the Far East. Half of this amount will be distributed in 2-oz. individual cans to United Nations troops. Intensive dusting of the civilian population will start as soon as additional supplies of the powders are available. United Nations forces have been relatively untroubled by the stubborn Korean louse principally because of the accomplishments of preventive medicine companies, strict sanitary discipline in the field, and regular baths and change of clothes for combat troops. Routine immunization against epidemic typhus has furnished additional protection against this disease.

GASTRIC CARCINOMA AND ACUTE PERFORATION

BY

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Until recently acute perforation was regarded as a rare complication of carcinoma of the stomach. The prognosis, both immediate and remote, was generally regarded as very poor. Aird (1935) published eight cases from the Edinburgh Royal Infirmary and collected 71 cases from the literature. He found that about half the cases mimicked perforated peptic ulcer, and he stated that in nearly 50% metastases were present at operation.

Incidence

Doll (1950) has put the matter in its proper perspective. He found 17 cases of carcinoma in a consecutive series of 500 perforations, 11 occurring in 452 cases submitted to operation. Of 86 male cases with an operation diagnosis of perforated gastric ulcer, seven proved to be malignant.

Unfortunately, it is difficult to assess the risk of malignancy in perforated gastric ulcer. The exact anatomical site of the perforation is frequently uncertain, oedema at operation often masking the pylorus. Many perforations are therefore labelled by the surgeon "juxtapyloric." Many of these ulcers no doubt are duodenal, but some are in the prepyloric inch. Illingworth *et al.* (1944), Avery Jones *et al.* (1950), and others include these "juxtapyloric" ulcers in the duodenal ulcer group. By subtracting them from the gastric ulcers the apparent incidence of malignancy in gastric ulcers will be increased. Post-operative determination of the exact site of the ulcer may be equally difficult. The radiologist often finds it impossible to locate the pylorus because of distortion and irritability, and the ulcer may be beyond the range of the gastroscope. A further source of error is the possibility of carcinoma manifesting itself much later, to exclude which all perforated gastric ulcers would have to be followed up for at least five years.

In an attempt to assess the risk of malignancy in perforated gastric ulcer the records of all gastric and duodenal perforations admitted to the London Hospital between January 1, 1945, and December 31, 1949, have been studied. Table I shows the distribution of the 111

TABLE I.—*Cases of Acute Perforation at the London Hospital, 1945–9. Site of Perforation*

	Diagnosis at Operation	Final Diagnosis	Deaths
D.U.	57	74*	7
G.U.	12	12	3
Juxtapyloric	28	17	0
Gastrojejunal	1	1	0
Carcinoma	3	6	2
Not proved	—	1	1
Total ..	101	111	13

* Includes one patient with two perforations in the period.

cases admitted, and gives the diagnosis made at operation in 101 cases. The final diagnosis is that made when the patient was last seen at this hospital. There is a substantial increase in the number of duodenal ulcers in the final list, mainly at the expense of the juxtapyloric group. Table II shows the primary treatment adopted

and the mortality of each procedure. In the whole series there were six cases of carcinoma (5.4%), of which five presented as acute perforations; the sixth was clinically silent, the diagnosis being made only at necropsy.

TABLE II.—*Primary Treatment*

	Number	Deaths
Simple suture	96	5*
Suture and gastro-enterostomy	3	2
Partial gastrectomy	2	0
Drainage only	1	1
Conservative treatment	4	0
No treatment (moribund on admission or diagnosis made at necropsy)	5	5
Total	111	13

* Excluding one death due to intestinal obstruction four weeks after a subsequent gastrectomy.

The difficulty of determining the total number of gastric perforations has already been explained, but the maximum number must be 36 when all known duodenal and gastrojejunal cases are subtracted. One unproved case is included for completeness, a case in which there was no operation or necropsy but there were clinical grounds for the diagnosis of perforation. The minimum incidence of carcinoma in gastric perforations is therefore 6 in 36 (16.7%), but some may well have been actually duodenal ulcers, in which case the incidence would be even higher.

Five of the carcinomata occurred in the prepyloric inch, and so far as can be determined from the records the total number of prepyloric perforations was 25, an incidence of 20%.

From the practical point of view, as it affects the surgeon, of 43 gastric and "juxtapyloric" perforations encountered at operation five proved to be carcinomatous. Table III shows the age and sex distribution of the

TABLE III.—*Age and Sex Distribution*

Age	Males			Females		
	D.U.	G.U. and Juxtapyloric	Carcinoma	D.U.	G.U.	Carcinoma
10–19	1	—	—	—	—	—
20–29	7	6	—	—	—	—
30–39	18	5	1	—	—	—
40–49	18	5	1	—	1	(1)*
50–59	18	8	3	—	—	—
60–69	6	2	1	2	1	—
70–79	4	1	0	—	—	—
Total	72	27	6	2	2	(1)

* Operation for perforation elsewhere (Case 6).

patients with ulcer and carcinoma. Most carcinomata, as of all perforations, occurred in males. The ages of the carcinoma patients range from 30 to 65, but five were between 48 and 57 years. The female case received treatment for her perforation elsewhere, being admitted here with pyloric stenosis.

An incomplete follow-up of the gastric and "juxtapyloric" perforations has not revealed any further cases of carcinoma, though the time since perforation is in many cases still too short for carcinoma to be finally excluded.

In the same five-year period there were approximately 400 admissions for carcinoma of the stomach, the diagnosis being proved at necropsy in 88 cases. Search of these records revealed only one further case, the woman already mentioned, in which perforation had preceded admission to this hospital by a short interval. A summary of the history and treatment of the seven cases of carcinoma is given, Cases 2 and 5 being personal cases.

Case Reports

Case 1.—A bus driver aged 57 was admitted with acute perforation on February 15, 1946. *History:* One year—loss of weight; three weeks—vomiting (barium meal showed pyloric stenosis); three hours—acute perforation. *Operation:* Large pyloric tumour with a small perforation on the posterior surface of the lesser curve. Perforation closed with difficulty, using an omental graft. Anterior gastrojejunostomy performed. Died on fourth post-operative day. No post-mortem examination.

Case 2.—A painter aged 51 was admitted with acute perforation on January 10, 1948. *History:* Five years ago—suspected gastric ulcer; two months—recurrence of pain and vomiting; four hours—acute perforation. Examination showed typical perforation and severe bilateral basal bronchiectasis. *Operation* under local anaesthetic: large high lesser-curve perforation closed by suture. Indurated ulcer 5 cm. in diameter. Recovered satisfactorily, with diagnosis of simple ulcer. Follow-up barium meal February, 1949, showed hour-glass stomach but no active ulcer. Laparotomy was postponed because of his severe chest disease, but he was admitted to another hospital and died on June 21, 1949. Post-mortem examination showed a carcinomatous ulcer of the upper end of the lesser curve, the site of haemorrhage, and metastases in the liver, pleura, peritoneum, diaphragm, and pericardium.

Case 3.—A canteen assistant aged 30 was admitted with acute perforation on January 21, 1949. *History:* A few years' dyspepsia, with no definite relation to meals; five hours—acute perforation. *Operation:* Anterior prepyloric perforation sutured. There was some post-operative gastric retention, and at the convalescent home vomiting increased, with visible peristalsis. A barium meal on February 25 showed pyloric stenosis but no neoplasm. *Second operation* (March 2): A prepyloric neoplasm adherent to the pancreas was found and an exclusion operation performed. Biopsy of lymphatic nodes showed secondary carcinoma. Obstruction was relieved, but when last seen six months later the patient was moribund.

Case 4.—A miller aged 52 was admitted with acute perforation on February 11, 1949. *History:* Three months—abdominal pain and vomiting; four days before—barium meal showed antral filling defect; four hours—acute perforation. *Operation:* Anterior prepyloric perforation sutured. Biopsy of a hard mass in the gastrocolic omentum showed carcinoma of stomach. *Second operation* (February 23): Transthoracic total gastrectomy. Large ulcerating carcinoma of lesser curve. Mucoid carcinoma invading four of twelve glands examined. In September, 1951, he was well and working, with no evidence of recurrence.

Case 5.—A barman aged 49 was admitted with acute perforation on October 27, 1948. *History:* Two years—epigastric discomfort relieved by alkalis; 10 months—barium meal showed prepyloric lesser-curve ulcer. Treated in out-patient department with relief of symptoms and gain in weight of 7 lb. (3.2 kg.). Three months—recurrence of symptoms; barium meal showed persistence of ulcer. Six hours—acute perforation. Review of radiographs led to suspicion of carcinoma. *Operation:* Indurated mass encircling antrum with perforation on anterior surface. Perforation closed by suture. *Second operation* (November 12): Radical partial gastrectomy. Diffuse extensive carcinoma encircling antrum, with a peptic ulcer at its distal edge, which had perforated. Secondary carcinoma in six lymphatic nodes. In May, 1950, he was well and working, with no evidence of recurrence. He died at home on June 26, 1950.

Case 6.—A single woman aged 48 was admitted with pyloric stenosis on October 16, 1946. *History:* Three years—weight loss; nine months—abdominal pain and vomiting; four months—operation elsewhere—suture of acute perforation of prepyloric ulcer. Since then there has been

increasing pyloric stenosis. Barium meal did not demonstrate the cause. *Operation* (October 18): Large prepyloric carcinoma found. Multiple peritoneal nodules—assumed to be seedling metastases. Biopsy of peritoneal nodule—no carcinoma. On January 24, 1947, gastroscopy showed large ulcerating carcinoma of antrum. *Operation* (February 1): In view of the negative biopsy re-explored, but metastases now found in liver, abdominal wall, and ovaries.

Case 7.—A man aged 67 was admitted on April 11, 1946, with a diagnosis of carcinoma of stomach. *History:* Six months—weight loss, 1½ st. (9.5 kg.); six weeks—pain and vomiting. Examination showed a thin wasted man with a palpable pyloric tumour. Deteriorated, and died 18 days later without any symptoms or signs of acute perforation. *Necropsy:* Carcinomatous ulcer encircling pylorus. Anterior perforation with pus, fibrin, and intestinal contents in general peritoneal cavity.

Discussion

It is remarkable that the frequent association of carcinoma with perforated gastric ulcer had escaped general recognition until the publication of Doll's paper. Routine follow-up of perforated gastric ulcers is exceptional, and it seems possible that in this way many latent cases have in the past been overlooked, as might well have happened in Case 2 of this series. It was this case, in fact, which first drew our attention to the problem. In the literature there are many reports of isolated cases of perforated carcinoma, but most of these describe cases in which the diagnosis of carcinoma was at once obvious, the cases mimicking simple ulcer receiving far less attention. Failure in diagnosis is the probable reason why the high incidence of malignancy has hitherto been unrecognized.

Diagnosis

A correct pre-operative diagnosis is unusual, the history and physical signs being ordinarily those of a perforated simple ulcer. Only when examination before perforation has revealed a lump, or a barium meal has shown a carcinoma, is the malignant nature of the perforation suspected. Rarely, distant metastases may be present, as in one patient seen in this hospital who refused admission and died in his own home. Provided that all perforated ulcers are treated by immediate operation no harm is done by failing to diagnose carcinoma before operation.

The disturbing fact is the frequency with which carcinoma is overlooked at the emergency operation. This occurred in three of these cases, in eight of Doll's cases, in one of Susman's (1939) three cases, and in the cases of Aird (1935), Reid (1948), and others. These cases are probably fairly early ones and offer the best prospects of cure by radical resection.

It is astonishing that this error is so often made. The most likely explanation is that the possibility of malignancy is not even considered by the surgeon. The key to the diagnosis is awareness of the high incidence of carcinoma. Inflammatory exudate and oedema may mask the true nature of the lesion, and the surgeon may be reluctant to do more than close the perforation. Correct diagnosis will depend upon a careful examination of the stomach, particularly by palpation, at the time of the emergency operation. Case 5 illustrates this point. At operation there was no outward sign of carcinoma, but re-examination of the pre-operative radiographs led to a suspicion of carcinoma, which was confirmed only by careful palpation of the whole pyloric antrum. The ulcer itself resembled in every way a simple peptic ulcer. The gastrectomy specimen showed that it was a peptic ulcer arising in the edge of an area of carcinomatous infiltration.

Biopsy of the edge of the ulcer may be of value in doubtful cases, though it was used only once in this series. It is, however, not entirely reliable, as the piece taken for section may come from the edge of a peptic ulcer, not from the associated carcinoma.

When great care is exercised, particularly in dealing with "juxtapyloric" perforations in middle-aged men, the proportion of correct diagnoses should be increased, but a few cases may still be overlooked. Post-operative follow-up of all cases is essential to detect these missed cases, but radiology is handicapped by the distortion inevitable immediately after perforation, and gastroscopy is not always reliable in detecting carcinoma in the prepyloric inch.

Treatment

There are two major alternatives—immediate gastrectomy or simple suture followed by early secondary gastrectomy. The only valid reason for immediate gastrectomy is difficulty in closing the perforation. This was certainly present in Case 1 of this series, who might have survived if immediate resection had been performed. The protagonists of immediate gastrectomy assert that there is always difficulty in suturing malignant perforations; but this is not so, at least in those cases simulating peptic ulcer. So far as cure is concerned there is no advantage in immediate gastrectomy. The chief disadvantage of immediate gastrectomy is that a major operation is performed, perhaps by an inexperienced surgeon, on an ill patient without preparation—all factors tending to increase the mortality.

The policy recommended is simple suture with confirmation of the diagnosis by palpation and perhaps biopsy at the emergency operation, followed by a radical gastrectomy two to three weeks later. The patient, after blood transfusion if required, is much better equipped to withstand such a planned secondary operation. In the two cases in which this was done no special difficulties were encountered.

What policy is to be adopted towards the "juxtapyloric" and gastric perforations in which the operation diagnosis does not suggest malignancy? Doll tentatively suggests immediate gastrectomy in men over 30 with perforated gastric ulcers, but such a policy would undoubtedly lead to a number of unnecessary resections. It is suggested that all perforated gastric and "juxtapyloric" ulcers should be carefully followed up, and that, unless they can be definitely proved to be benign by radiology and gastroscopy, they should be treated by early gastrectomy. In the group of ulcers in the prepyloric inch exclusion of malignancy is so difficult and the incidence of carcinoma so high (20%) that early gastrectomy is indicated in every patient over 40 years and should be seriously considered even in younger patients.

Prognosis

Traditionally the immediate prognosis is poor because of difficulty in closing the perforation, and the remote prognosis hopeless because of widespread peritoneal dissemination resulting from the perforation. The cases here reported support neither of these beliefs. There is no reason why simple suture should carry a mortality much higher that that in cases of simple ulcer. These cases are often relatively early and without metastases, so there is no reason to suppose that the ultimate

prognosis is any worse than that of non-perforating carcinomas. Neither of the two cases resected showed ascites or other evidence of widespread peritoneal metastases. One died after 20 months, but the other is alive and well with no evidence of recurrence 31 months after total gastrectomy.

Summary

Of a total of 111 acute perforations in five years, 6 proved to be carcinomatous. The incidence of carcinoma in perforated gastric ulcer was at least 16.7%, and may have been even higher. The reasons why it is impossible to assess this risk exactly are discussed.

Seven cases of carcinoma associated with perforation are reported, in three of which the diagnosis was missed at operation. The reasons why carcinoma is frequently overlooked are discussed. The surgeon should consider the possibility of malignancy in every perforated ulcer.

Simple suture of the ulcer, followed by gastrectomy after an interval of two to three weeks, is recommended. Immediate gastrectomy is indicated only exceptionally.

The incidence of carcinoma in prepyloric perforations is so high (20%) that secondary gastrectomy is advised in all these patients over 40 years.

The immediate prognosis is little worse than that of perforated simple ulcer, and there is no reason to regard the ultimate prognosis as hopeless.

I wish to thank those members of the surgical staff of the London Hospital under whose care these cases were treated for permission to use their records. My thanks are also due to Mr. Alan Perry, Dr. Denys Jennings, and Mr. J. E. Richardson for their help and criticism in the preparation of this paper.

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COUGH FRACTURE

BY

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My interest in cough fracture was stimulated by the following case.

A woman aged 32 complained on December 6, 1949, of a vigorous dry cough, of feeling feverish, and of pain around the seventh left intercostal space overlying the anterior axillary line. The pain was worse on coughing and on deep breathing. Three days later her temperature was 102° F. (38.9° C.); her doctor heard a pleural rub, and gave sulphathiazole. Next morning her temperature was normal, and remained so. Her chest was *x*-rayed six weeks later. The standard postero-anterior view looked normal, but the left anterior oblique view showed a recent fracture of the seventh left rib. It appeared that a simple cause of pleurisy had been overlooked and would never have been found had not an oblique *x*-ray view of the chest been studied.

Since Graves (1833) described a case of cough fracture more than 130 have been reported. Malgaigne (1859), Gurlt (1862), Bähr (1894), Tunis (1890a, 1890b), and Seilin (1917) have collected cases and reviewed the subject. Pospischill (1921) reported 14 cases occurring in children with whooping-cough. Richardson (1936) found 30 cases among tuberculous subjects. Oechsli (1936) reported a further 12 cases and Cohen (1949) seven cases. Paulley *et al.* (1949) reported four cases occurring in pregnant women. Until recently cough fractures were regarded as rare accidents. With one exception (Palfrey, 1924) there has been no published account of their common occurrence in otherwise healthy subjects. Webb and Gilbert (1923) and Richardson (1936) said that the fractured rib might easily be missed. Webb and Gilbert (1923), Howson (1934), Swineford and McKinnon (1945), and Douthwaite (1949) have suggested that these fractures occur far more often than is generally supposed. In order to test this, *x*-ray films in the anterior oblique as well as in the standard position were taken in all patients referred for unilateral chest pain that was worse on coughing and on deep breathing (pleural pain), in the absence of another cause. In cases of doubtful fracture the examination was repeated about two months later to see if callus had formed.

The Present Series

Out of 720 new adult non-tuberculous patients referred by general practitioners on account of chest symptoms (over a period of a year), 106 (14.7%) had pleural pain. These are analysed in Table I.

TABLE I.—*Incidence of Cough Fracture as a Cause of Pleural Pain*

		No. of Cases	
Abnormalities noted on *x*-ray film indicating some other cause for the pain		42	
X-ray appearances normal:			
Clinical diagnosis	1. No cause found	24	50
	2. Dry pleurisy or resolved pleuropneumonia	19	
	3. Muscle strain	5	
	4. Direct trauma to chest wall	2	
Cough fractures		14	

In all cases of cough fracture coughing occurred before the onset of pain. Coughing was vigorous in all cases except one in which the patient tried hard to suppress it. Five had a dry and nine a productive cough when the pain came on. In only five was the onset of pain sudden; three others had an ache in the side which suddenly changed to a stabbing pain after several days; in the remaining six the onset was gradual. Eleven said that the pain was severe, the severe pain lasting from 48 hours to 14 days (one said that it remained, on coughing, severe for three months); three denied that the pain was ever severe. One patient said she was free from pain after a month, but the average duration of pain was three months. In one patient pain was still present after six months.

In 12 patients pain was referred to an area surrounding the anterior axillary line and the segment corresponding to the fractured rib or the rib below. In one patient the fifth right rib was fractured just in front of the mid-axillary line and pain was referred to the seventh and eighth spaces in the scapular line; in another a fractured second left rib gave rise to pain along the vertebral border of the left scapula (pressing on the rib or working the serratus anterior reproduced the pain). Coughing and deep breathing made the pain worse in all cases; in seven moving the trunk and in three contracting the serratus anterior made it worse. Holding the side, lying on the unaffected side, avoiding any sort of movement, and, in one case, lying with the painful place pressed against a hard pillow were mentioned as giving relief. The patients were all well-nourished healthy-looking subjects.

Discussion

In many cases previously reported the patient felt a snap in the side during a vigorous bout of coughing followed by a severe pain. This suggested the diagnosis, which was easily confirmed by well-localized tenderness, crepitus, and often even palpable bone fragments. This sort of case is rare. In the present series all were surprised to learn that they had broken a rib; only one admitted feeling a snap. Comment cannot be made on local signs, because with one exception—a patient who had a loud pleural rub 48 hours after the onset of pain—the patients were seen too long after the pain began. Two practitioners heard pleural rubs; there were no other remarks about local signs in doctors' letters.

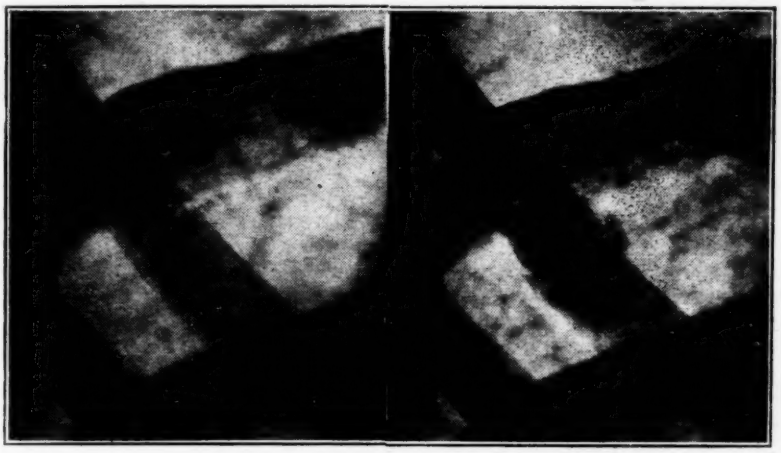

FIG. 1. FIG. 2.

FIGS. 1 AND 2.—Case 3. The fracture seen on Fig. 1 was much more obvious two months later, Fig. 2. (Oblique views.)

Swineford and McKinnon (1945) and Cohen (1949) said that the pain of cough fracture was indistinguishable from that of pleurisy. As long ago as 1852 John Hilton taught that a rib fractured by muscular violence might give rise to pleurisy. The presence of a pleural rub in three cases in this series supports this view. It is suggested that cough fracture has masqueraded as primary pleurisy, pleuropneumonia, and fibrositis.

The need for taking oblique views and repeat *x*-ray films after callus has formed has been stated before (Richardson, 1936; Cramer, 1943; Swineford and McKinnon, 1945; Bodenheimer, 1948; Douthwaite, 1949). Their usefulness is illustrated in Table II.

TABLE II.—*Analysis of X-ray Findings*

Case No.	Sex	Age	Rib Broken	Fracture Seen in Both Views	Seen in P.A. View Only	Seen in Oblique View Only	Repeat *X*-ray Needed for Confirmation
1	F	32	7th L.			+	
2	F	28	7th R.	+			
3	F	37	5th R.	+			
4	F	29	5th R.			+	+
5	F	30	7th R.			+	
6	F	21	6th L.			+	+
7	M	21	7th R.			+	+
8	M	35	10th L.	+			
9	F	50	2nd L.		+		
10	F	27	9th L.		+		+
11	M	46	8th L.	+			
12	F	49	10th L.			+	
13	F	39	6th L.			+	
14	M	31	8th L.			+	

In no case was the fracture conspicuous; all would have been overlooked unless specially sought. Even so, standard views revealed only six cases, and in four of them the insufficient evidence needed confirmation by *x*-ray films later (see Figs. 1 and 2). In one case two oblique views were taken at slightly different angles to provide conclusive evidence. Oechsli (1936) observed that these fractures occurred just in front of the origin of the serratus anterior (upper eight or nine ribs) or just behind the origin of the obliquus externus abdominis (lower eight ribs). This provided a rational explanation for their situation. They are easily missed, because in standard *x*-ray views the lateral parts of the ribs are crowded and are apt to be obscured by scatter radiation, especially when, as is usual, "soft" films are taken which are designed to show lung lesions rather than bony defects.

Summary

Cough fractures were specially looked for during 1950 at the Cambridge Chest Clinic among patients with pleural pain in whom no other cause was apparent. An oblique *x*-ray view was taken in addition to the standard anterior view. The examination was repeated in doubtful cases after callus had had time to form. Out of 64 such patients 14 (21.9%) had fractured ribs.

John Hilton's teaching in 1852 that a fractured rib may readily be missed as a cause of pleurisy is reiterated.

I wish to thank Mr. W. R. LeFanu, Librarian, Royal College of Surgeons, for sending me a typescript of Graves's (1833) report; Dr. E. M. Cheffins for his co-operation; and Dr. W. Paton Philip, consultant chest physician, for permission to publish.

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A new hand-operated pump, about 4 in. in diameter (it is of circular shape) and ½ in. thick, has just been developed in New York to give rapid blood transfusions. The supply rate and pressure are controlled, and the pump is expected to be particularly useful in cases of extreme shock and massive bleeding where an intra-arterial delivery may be needed. It will supply a pint of blood in one and a half minutes, working at its top speed, without danger of air embolism. The mechanism is very simple, and consists essentially of a roller which milks the blood through a collapsible rubber tube (*New York Times*, Supplement, December 2).

COUGH FRACTURE OF THE RIBS UNASSOCIATED WITH PULMONARY TUBERCULOSIS

BY

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Fracture of the ribs may be produced by frank trauma, or may follow local or generalized abnormalities of the bones, which reduce their ability to withstand the strain of normal muscular movement. A further type has been described and variously referred to as "stress," "cough," or "fatigue" fracture—a diversity of names which reflects the doubt still held concerning its cause. This article is concerned with the latter group of fractures, which, for the sake of clarity, must again be subdivided into those affecting the lower ribs—most commonly the sixth to the eleventh inclusive—and those affecting the first rib.

The Literature

Fracture of the lower ribs following cough or, less commonly, other muscular effort was first described by Graves in 1833, and has been reported at intervals since. Several theories have been held responsible for these fractures, but their constant association with cough or other expiratory effort undertaken with a closed or partially closed glottis must be emphasized. This form of stress is most probably present even in those cases which seem to follow muscular exertion alone. Disadvantageous posture at the moment of strain has also been described and may be a factor in many cases. Oechsli (1936) thought that the opposing action of two sets of muscles on the rib was necessary to produce them. He pointed out that the common site of fracture was along the line where the muscles of the shoulder girdle and anterior abdominal wall interdigitate, and that both groups may be tensed at the time of coughing.

Seilin (1917) maintained that contraction of the diaphragm was necessary as a contributory factor, but the site of the majority of fractures renders this hypothesis untenable. Richardson (1936) found cough fractures in 6.5% of patients with advanced pulmonary tuberculosis and in only 0.08% of those with incipient disease. He thought that there was evidence that softening of the ribs occurred in advanced tuberculosis. Bond (1945) was of opinion that continuous coughing caused a change in the ribs analogous to that which occurs in the "fatigue" fractures of weight-bearing bones. Paulley *et al.* (1949) thought that cough fractures in pregnancy might be partly due to the uterine mass being driven backwards and upwards against the inner surface of the lower chest on the left side.

Whatever their exact causation, cough fractures, confirmed radiographically, have been judged rare except when associated with pulmonary tuberculosis. But Cohen (1949), who reported seven cases, thought that these fractures were rare even when associated with pulmonary tuberculosis, though Oechsli (1936), with 21 cases, and Richardson (1936), with 27 cases, thought them not uncommon. Apart from tuberculosis 12 children with cough fractures complicating pertussis were described by Pospischill in 1921, but no series in adults has exceeded four in number (Cramer, 1943), and single cases are still being reported (Bodenheimer, 1948; Gelfand, 1949). Paulley *et al.* (1949), however, thought them to be relatively common in late pregnancy, though they were able to collect only six cases from the literature to add to the four they detailed.

Fracture of the first rib arises most often in those subjected to unaccustomed exertion, and is more common in men (Alderson, 1944; Garber, 1944). It has been reported in status asthmaticus (Ginsburg, 1947) and in patients without obvious cause. It has no relation to cough and, unlike fractures of the lower ribs, is usually asymptomatic. Though probably caused by the action of opposed muscles, it should not be classed as a cough fracture, but differentiated as a "stress" fracture. The term "fatigue" fracture (Hartley, 1943) should be reserved for those of weight-bearing bones.

Present Series

The histories of nine cases of true cough fracture of the ribs unassociated with pulmonary tuberculosis are summarized.

Case 1.—A woman aged 28 was six months pregnant when first seen on March 29, 1949. She complained of pain in the right chest that was made worse by coughing or deep breathing. This pain had appeared suddenly during a spasm of coughing about five weeks previously, at the start of a respiratory infection. Examination showed no abnormal signs in her lungs, but a tender localized area was present over the sixth rib anteriorly. On this date a postero-anterior (P.A.) radiograph of the chest showed slight elevation of the left side of the diaphragm accompanied by shadowing in the lower zone of the left lung suggesting pneumonia. A fracture with some displacement of the anterior part of the sixth right rib was obvious. No callus was observed round this fracture at any time.

Case 2.—A woman aged 28 was first seen on August 30, 1949, when she gave a history of having had cough and sputum for over six months and an aching pain in the left shoulder for about 14 days. There were signs of widespread bronchitis. A P.A. radiograph showed no evidence of disease of the lungs, but a linear fracture without displacement of the posterior third of the seventh left rib about 4 cm. from the tubercle was present, though it was not diagnosed until a further film on September 27, 1950, disclosed callus surrounding the fracture.

Case 3.—A man aged 56 was referred on January 12, 1950, for an exacerbation of bronchial asthma, which had been accompanied by stained sputum. On examination signs of bronchitis were found. A P.A. radiograph was normal. A further film taken on July 13 showed the callus of a fracture of the posterior third of the ninth right rib, 9 cm. from the rib tubercle. Direct questioning elicited the fact that he had had pain in the right chest posteriorly for over three months. He dated this pain to about four weeks previous to a radiograph taken on April 13, which showed no abnormality of the ninth right rib in the area later developing callus. It is of interest that his pain had never been of sufficient severity for him to mention it.

Case 4.—A man aged 73 was first seen at his home on January 26, 1950. He gave a history of chronic cough and sputum, which had been much increased for about seven days. During this time there had been pyrexia and a pain in the right chest posteriorly that was made worse by movement, coughing, and deep breathing. On examination the breath sounds were slightly weak over the right lower zone anteriorly and posteriorly, where a pleural rub was heard. On March 2 he was well, apart from his usual cough and the pain in the right chest. A P.A. radiograph on this date

showed shadowing in the right lung suggesting a resolving pneumonia of the posterior segment of the right upper lobe (confirmed by lateral film). A small indefinite shadow was also present in the outer part of the lower zone above the diaphragm. A further radiograph on March 16 showed some resolution of the shadow in the upper lobe. The shadowing in the lower zone was still present, but the inner part of this shadow had become denser and was now diagnosed as callus forming round a fracture of the posterior third of the tenth right rib about 9 cm. from the tubercle. Reference to the film of March 2 showed that part of the shadow in the lower zone was apparently the ninth rib, though no fracture line was apparent. Evidence of increased density localized to this area of the tenth rib was still present on September 21, the lung fields being normal.

Case 5.—A woman aged 28 first attended on March 21, 1950, complaining of pain round the lower part of the right chest and cough of about four weeks' duration. The pain had followed a spasm of coughing, which, with deep breathing, made it more acute. No abnormal physical signs were found in the lungs, but an area of tenderness was present over the anterior part of the seventh right rib. A P.A. radiograph was normal, as was a further film on April 18. On June 14 she was admitted to hospital with symptoms and physical signs of a right basal pneumonia. Pain was still present over the same area as previously. A radiograph on this date disclosed a fracture at about the junction of the middle and anterior thirds of the seventh right rib with callus formation as well as a basal pneumonia.

Case 6.—A woman aged 29 was first seen on June 6, 1950, complaining of a sore throat, cough, and pain in the right side of the chest, made worse by a deep breath. There was no history of sudden onset of this pain, which lasted about 10 days. Her lungs were normal on examination. A P.A. radiograph showed no abnormality of the lungs, but fractures of the anterior parts of the seventh and ninth right ribs were apparent, although not diagnosed until a further radiograph taken on July 4 disclosed the presence of callus round the fractures.

Case 7.—A man aged 45 was first seen on July 6, 1950, complaining of long-standing cough and sputum. During the previous week pain had been felt in the right chest posteriorly on coughing, but no history of sudden onset was obtained. A P.A. radiograph showed an irregular cystic appearance suggestive of bronchiectasis in the upper and middle zones of the right lung. A fracture of the middle third of the seventh right rib with slight displacement was also present.

Case 8.—A woman aged 28 was first seen on July 18, 1950. She complained of cough and sputum of about eight months' duration, but even on direct questioning she stated that she had not suffered from any pain in her chest. Examination showed weak breath sounds, diminished movement, and a few adventitia over the right lower zone posteriorly. A P.A. radiograph disclosed callus formation in the anterior thirds of the sixth and seventh left ribs. It is of interest to note that this patient had been referred to another hospital for radiographic examination because of pain and tenderness over the area of the seventh left rib. A P.A. radiograph on March 15, 1950, was reported on as showing a congenital abnormality of the seventh left rib. This film, when viewed, showed callus formation of the seventh left rib but no evidence of any lesion of the sixth rib. The latter fracture, therefore, presumably developed after March 15.

Case 9.—A woman aged 22 was first seen on October 24, 1950, when she complained of cough and pain in the right side. This pain had occurred suddenly while coughing three weeks previously, and was made worse by deep inspiration. On examination there were signs of widespread bronchitis and tenderness over the lower ribs on the right side. A P.A. radiograph showed no abnormality in the lung fields, but fractures in the anterior thirds of the ninth and tenth right ribs were present.

Analysis of Symptoms and Radiographic Findings

Among these patients there were six women and three men; the youngest was aged 22 and the oldest 73. Pain was present in all, but in only three was it described as of sudden onset. Two patients admitted pain on direct questioning only, and one, who denied having suffered any pain in her chest, had actually been radiographed four months previously for this symptom. Tenderness was demonstrated over the area of fracture in three. It therefore seems that these fractures, unlike those of the first rib, are usually accompanied by pain. Cough was present in every case, but there appeared to be no connexion between the cause of the cough and the liability to fracture. The right side was affected in seven patients and the left in two. This distribution is opposite to that most often found, but Oechsli (1936) thought that there was no bias towards either side. As in most previous reports, only the sixth to the eleventh ribs were implicated. Three fractures occurred in the posterior third of the rib, an unusually high proportion for this position.

The radiographic findings are important, as confirmation of the diagnosis can be obtained by this means alone. In no patient was any underlying abnormality seen in the ribs. Ordinarily a P.A. radiograph was available, other views, if necessary, having to be specially obtained. Three of these fractures were diagnosed when the first film was examined, one other was visible but was not recognized until a later film showed callus formation, and one was readily seen because of the presence of callus. No fewer than four (44%) were diagnosed on subsequent films because of the formation of callus, and reference to the first radiograph showed no evidence of fracture in this area. From these facts it may be seen that the diagnosis may offer considerable difficulty, and if only one radiograph is taken it may be impossible. Lateral or oblique views were secured in five cases but failed to reveal any fracture that was not obvious in the P.A. position. To exclude the diagnosis of cough fracture it is necessary to take a second radiograph after time has been allowed for the formation of callus.

Discussion and Conclusions

Nine patients suffering from cough fractures unassociated with pulmonary tuberculosis or abnormality of the ribs were found among 2,431 new patients referred for an opinion on the chest between March, 1949, and October, 1950. Such an incidence (0.37%) is not rare. Moreover, it is unlikely that every case of cough fracture was detected; first, because of the difficulty in seeing them, and, secondly, because the need for taking subsequent films in all patients who complained of pain in the chest was appreciated only during the last year of this review. Even during the latter period a considerable proportion of such patients were not recalled for a further radiograph. Unless an alternative cause can be found, the diagnosis should be entertained in every case of chest pain accompanying cough, particularly if there is a history of sudden onset following cough or other effort, and if the pain is made worse by deep inspiration. Dry pleurisy, Bornholm disease, and the chest pain that may precede pleural effusion (Sibley, 1950) must be excluded. The diagnosis is not, however, justified by a history of pain of sudden onset and localized tenderness

following cough unless there is radiographic confirmation. Several cases with these symptoms have been seen in which there was no evidence of fracture or subsequent callus formation, and which must therefore be presumed to be due to some injury of the soft tissues.

It is unlikely that these fractures have any definite relation to pulmonary tuberculosis or pregnancy. The former combination has cough of increasing severity with advanced disease as a constant symptom and no obvious bony changes in the ribs; the latter combination also has been observed only in the presence of cough. Therefore, unless a high incidence of these fractures is found in the future, it seems unnecessary to postulate any other than a fortuitous association, especially as the condition is commoner in women.

The recognition of these fractures is usually of little practical significance except that strapping will relieve the pain if severe. However, if the rounded area of callus lies over the lung field it may be taken for an intrapulmonary shadow more easily than is generally realized. I have come across two instances in which callus round a fracture in a rib was temporarily diagnosed as disease in the lung.

Summary

Nine cases of cough fracture unassociated with pulmonary tuberculosis are reported.

Attention is drawn to the relative frequency of these fractures and to the difficulty in detecting them other than by the presence of callus formation.

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During the last 35 years the Rockefeller Foundation has granted fellowships to over 6,000 individuals from 75 countries, and by the end of 1950 the amount of money expended for this purpose was roughly $19,000,000. The Foundation has in addition made grants of about $9,500,000 to other organizations for their fellowship programmes. The *Directory of Fellowship Awards for the Years 1917–1950*, recently issued by the Foundation, lists 5,026 recipients of fellowships who are traceable. Name, country of origin, date of birth, highest degree, address, present position, and other details are given, making the directory a valuable addition to current biographies of the medical sciences. Some idea of the distribution of fellowships can be gauged from the fact that in 1950 the international health division awarded 2,566 (including 689 to nurses), the medical sciences division awarded 1,263, the natural sciences division 1,219, the social sciences division 823, and the humanities division 471. The directory is published from the office of the Foundation at 49, West 49th Street, New York.

WESTERGREN AND WINTROBE METHODS OF ESTIMATING E.S.R. COMPARED*

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The present investigation was conceived as a result of the observation by one of us (A. J. S.) that in two cases of acute tuberculosis the erythrocyte sedimentation rate (E.S.R.) when estimated by the Westergren method was considerably raised, whereas by the Wintrobe method it was within normal limits. It was decided, therefore, to make tests on a series of patients, male and female, by both methods, to see what measure of agreement was obtained.

Technique Employed

Wintrobe Tubes.—Test-tubes (3 by $\frac{1}{4}$ in.—7.5 by 1.25 cm.) graduated with a mark at 2 ml. were coated with 4 mg. of Heller and Paul's anticoagulant mixture (three parts ammonium oxalate and two parts potassium oxalate) and stoppered with red rubber stoppers.

Westergren Tubes.—Similarly graduated (3 by $\frac{1}{4}$ in.—7.5 by 1.25 cm.) tubes containing 0.4 ml. of 3.8% sodium citrate solution were used. These tubes were stoppered with black rubber stoppers.

The tests were made as follows. Blood samples were taken by venepuncture, dry-heat sterilized syringes and needles being used. A rubber tourniquet was lightly applied in most cases. As soon as enough blood had been withdrawn, the needle was removed from the syringe and blood was delivered to the mark in the Wintrobe collection tube and then into the Westergren collection tube. The two tubes were at once stoppered and the contents mixed by gentle shaking.

The tests were put up as soon as possible after venepuncture—the great majority within 30 minutes from the time of taking the blood. Before filling the sedimentation tubes each blood sample was mixed by hand-shaking for approximately two minutes. Care was taken to see that the spirit levels of the Wintrobe rack were correctly adjusted, and in the case of the Westergren tests a plumb-line was used to assist in setting the tubes to a vertical position. Variations in room temperature were not considered sufficient to warrant recording, the temperature being fairly constant at about 20° C.

The E.S.R. value recorded was the length in millimetres of the column of plasma above the packed red cells, read at the end of one hour.

Although corpuscular volume determinations were made in all cases which showed a raised E.S.R. value, no correction for low C.V. values was applied to the figures quoted in this article; doubts about the merits of applying a correction to the Wintrobe E.S.R. reading have within recent years been expressed and discussed (Sinton, 1948; Terry, 1950). Had a correction been

*The work for this paper was done in Winson Green Hospital, Birmingham, while we were respectively the deputy medical superintendent and the chief technician of the hospital.

applied, the number of significant differences between the Westergren and Wintrobe results would have been even greater.

Results

In this investigation the female findings were kept separate from the male ones in order to see whether sex had an influence on the difference, if any, found between the two sets of figures. The results are set out in Tables I–IV.

TABLE I.—*Wintrobe-Westergren Comparison (Females)*

(1) No. examined	468
(2) No. with Wintrobe of 20 mm. and over	140 (30%)
(3) Proportion of (2) with Westergren of 8 mm. and over	140 (100%)

TABLE II.—*Westergren-Wintrobe Comparison (Females)*

(1) No. examined	468
(2) No. with Westergren over 12 mm.	180 (38%)
(3) Proportion of (2) with Wintrobe under 20 mm.	49 (27%)
(4) Proportion of (2) with Wintrobe under 15 mm.	19 (10·5%)
(5) Proportion of (2) with Wintrobe of 12 mm. and under	12 (6·5%)

TABLE III.—*Wintrobe-Westergren Comparison (Males)*

(1) No. examined	267
(2) No. with Wintrobe of 10 mm. and over	82 (31%)
(3) Proportion of (2) with Westergren of 6 mm. and over	82 (100%)

TABLE IV.—*Westergren-Wintrobe Comparison (Males)*

(1) No. examined	267
(2) No. with Westergren of 6 mm. and over	110 (41%)
(3) Proportion of (2) with Wintrobe under 10 mm.	31 (28%)

Table V gives examples of discrepancies obtained between the two methods in cases with obvious physical disease.

TABLE V.—*Discrepancies Between the Westergren and Wintrobe Methods in Known Cases of Physical Disease*

Case No.	Disease	Sex	E.S.R. (mm. in one hour)	
			Westergren	Wintrobe
1	Active pulmonary tuberculosis	F	33	18
2	,, ,, ,,	F	37	12
3	Suspected ,, ,,	F	37	16
4	Recent caesarean section	F	24	17
5	Bronchiectasis	F	15	12
6	Suspected pulmonary tuberculosis	F	16	18
7	Acute pulmonary infection	F	23	10
8	G.P.I. (untreated)	M	26	3
9	,, ,,	M	11	4
10	,, ,,	M	7	1
11	,, ,,	M	6	3
12	Cushing's disease	M	9	9

Discussion

It will be seen from Tables I and III that where there is a raised E.S.R. as estimated by the Wintrobe method (20 mm. and over in one hour being taken as abnormal for females and 10 mm. and over for males) the Westergren results are in complete agreement.

When the Wintrobe is compared with the Westergren, however, a very different picture is presented (see Tables II and IV). In the case of the females, even when only figures greater than 12 mm. Westergren are taken to be abnormal, a higher proportion of the total number examined are shown to have a raised E.S.R. (38% as against 30%). Of this proportion, those with a Wintrobe of under 20 mm. total 27%—a very big discrepancy. Those with a Wintrobe of under 15 mm. amount to 10.5%, and there are even 6.5% with a Wintrobe of 12 mm. and under.

The figures from the male series are also interesting. With 6 mm. and over being regarded as abnormal, there is again a higher proportion of the total number examined shown to have a raised E.S.R. (41% as against 31%). Of these abnormal Westergren results, those with a Wintrobe value of under 10 mm. total 28%. Two out of 62 cases having a Westergren of over 10 mm. had a Wintrobe value of under 10 mm., and both these were cases of untreated G.P.I.

The cases listed in Table V are instructive. Cases 1 and 2 were the ones which first drew attention to the discrepancy which seems to occur. Case 1 was one of pulmonary tuberculosis, proved radiologically and with tubercle bacilli present in the sputum. Although Case 2 died from active phthisis a few weeks after admission, her E.S.R. as estimated by the Wintrobe method was only 12 mm., whereas her Westergren reading was 37 mm. Case 7 was acutely ill physically on admission, and a pulmonary abscess was suspected. On admission her Wintrobe E.S.R. was 50 mm., whilst her Westergren was 112 mm. Two weeks later, when she was improved though yet far from well, the Westergren was still abnormal (23 mm.), as was only to have been expected, but the Wintrobe value (10 mm.) was well below the upper limit of normal.

It is interesting to note that all the male cases of G.P.I. admitted while the investigation was in progress, and examined before treatment, showed a slightly raised Westergren E.S.R., whereas in each case the Wintrobe was found to be normal. Case 8 was acutely ill physically on admission, and the Westergren figure in his case was much higher at 26 mm. than those figures obtained from the other cases of G.P.I., although some days later it had fallen to 12 mm. The Wintrobe E.S.R. was quite normal on both occasions.

Sinton (1948), making serial tests on female patients suffering from pulmonary tuberculosis, found the Westergren method of estimating the sedimentation rate more reliable than the Wintrobe method.

Our results show that not only do serious discrepancies exist between the two methods in cases of pulmonary tuberculosis, but that they also occur in other conditions. We have found that in a fairly large series of cases a raised Wintrobe figure was always accompanied by a raised Westergren; but a raised Westergren was not accompanied by a raised Wintrobe in as many as 27% of the female and 28% of the male cases.

We found also that, in the cases of some gravely ill patients, the Wintrobe method (only) gave normal—and therefore very misleading—results; or else it became normal after having given a high reading before the clinical condition of the patient, as judged by other standards, justified it.

Thus, when these results are related to clinical conditions, our findings clearly support the opinion that the Westergren method is more sensitive and more reliable than the Wintrobe method.

Summary and Conclusions

The Westergren and Wintrobe methods of estimating the E.S.R. are compared, and the results related to the clinical findings.

The Wintrobe method was found to be misleading in a few important cases.

We are of the opinion that as a screening test and as a pointer to organic disease the Westergren method is to be preferred.

We would like to thank Dr. J. J. O'Reilly, medical superintendent of Winson Green Hospital, for permission to publish this paper and for his interest in the work.

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INTERDIGESTIVE GASTRIC SECRETION IN DUODENAL ULCER

A STUDY OF THE COMPARATIVE INHIBITION BY HEXAMETHONIUM IODIDE AND L-HYOSCYAMINE

BY

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Since it was first demonstrated that patients subject to duodenal ulcer tend to have a higher interdigestive gastric secretion than normal subjects (Henning and Norpoth, 1933) its control has been attempted by various methods. The theories of its causation lie between continuous formation of histamine-like substances and constant excessive activity of the gastric secretory fibres of the vagus nerve (Dragstedt, 1942). Dragstedt and Owens (1943) demonstrated that bilateral vagotomy reduced the interdigestive secretion to normal levels, and postulated that the excessive secretion was of neurogenic origin.

Hence atropine, being a parasympathetic paralysant, is the natural drug of choice to reduce vagal secretion. Mears (1943) demonstrated a reduction in volume and acidity in a proportion of cases given 1/75 gr. (0.8 mg.) three-hourly by proctoclysis. He noted a greater relative reduction in cases of duodenal ulcer than in normal subjects. Kirsner *et al.* (1948), however, reported a number of patients with grossly excessive interdigestive acid outputs who were entirely unaffected by doses up to 6 mg. (1/10 gr.) of atropine. Other workers noted variable effects (Avey *et al.*, 1950; Keefer and Bloomfield, 1926).

Various ganglionic paralysants have also been used for their vagal paralysant effect. Tetraethylammonium chloride (Ferrer, 1948) and other tetra-ammonium compounds—dibutoline (Levin *et al.*, 1949; Lorber, 1950) and banthine (Smith *et al.*, 1950)—have reduced secretion in a proportion of subjects, but when compared with atropine have not proved significantly more effective. Hexamethonium salts (Kay and Smith, 1950a) have been shown to reduce interdigestive secretion effectively.

Preliminary studies with large doses of belladonna were found to reduce interdigestive secretion substantially. It was therefore decided to compare the effects of intramuscular hexamethonium with those of oral L-hyoscyamine, the alkaloid of belladonna with the greatest peripheral paralysant effect (Goodman and Gilman, 1941). Oral hexamethonium has not been used, although it is reported to reduce the volume and acidity of gastric secretion (Kay and Smith, 1950b).

Methods

Five male subjects with symptoms of peptic ulcer dyspepsia and radiologically demonstrable duodenal ulcer were studied. Their ages ranged from 30 to 53 years and their weights from 125 to 162 lb. (56.7 to 73.5 kg.). Symptoms had been present from seven to fifteen years.

At 3.30 p.m. the patient had a light meal of a cup of tea and two plain biscuits. Ryle's tube was passed, at 8 to 8.30 p.m., through the nose, after local analgesia. The position of the metallic tip of the tube was confirmed by *x*-ray fluoroscopic examination to overlie the left half of the vertebral column. The subject lay on the left side. No attempt was made to get him to spit out saliva. The stomach was emptied, and continuous suction then applied by means of an electrical pump, a valve being used to prevent a greater suction pressure than 4 cm. Hg. Even so, blood clots were found in some specimens.

At the end of each hour the receiver was emptied, the volume being measured. A syringe was used to aspirate any residual juice, and air was then squirted down the tube to ensure patency so far as was possible. Continuous suction was applied again, collection being continued for ten hours. These duties were performed by the nursing staff. We wished to assess that the majority of the collection was made by continuous, not intermittent, suction, for which purpose the hourly volume by pump suction was compared with the total hourly volume. Samples collected at the end of each hour were placed in a refrigerator until estimated.

The final dose of belladonna or L-hyoscyamine was determined by giving gradually increasing oral doses nightly at 8 p.m., until that dose was reached at which the subject complained of blurring of vision and dry tongue on waking the next morning—that is, at 7 to 8 a.m. On those evenings when collections were made after giving belladonna or its alkaloids no aspiration was made before an hour had elapsed. Hexamethonium iodide ("hexathide") was given intramuscularly in three doses of 100 mg., each at three-hourly intervals —at 9 p.m., midnight, and 3 a.m.

The next afternoon the following values were determined: volume, free and total acidity, and peptic activity of each hourly sample. Samples were studied irrespective of the presence of bile staining. The volume of each sample was measured to the nearest millilitre in a graduated cylinder. The acidity was determined by titration with N/10 NaOH on 2 ml. of gastric juice with Topfer's reagent and phenolphthalein as indicators. The pepsin content was estimated by Hunt's method, in which dried human plasma is the source of the substrate (Hunt, 1948).

Results

It so happened that the maximum tolerated dose of L-hyoscyamine was of the same order in all subjects—7/100 gr. (4.6 mg.)—and that the dose of tincture of belladonna was comparable—210 min. (12.6 ml.). (The *B.P.* lays down a standard strength of about 1/100 gr. (0.65 mg.) hyoscyamine in 30 min. (1.8 ml.) of tincture.) All subjects received the same dose of hexamethonium iodide, irrespective of body weight.

In the Table are given mean hourly values for each collection made. The percentage reduction of output, as a result of the drug given, is worked out from the mean of the control collections made before and after administration of the drugs. In two subjects a third collection was made between the exhibition of the two drugs, and in these cases this collection also is taken into consideration in calculating the mean of the control readings.

The Chart shows graphically the mean outputs relative to the initial control values, which feature as 100%. It will be seen that with tincture of belladonna, or L-hyoscyamine, and with hexamethonium iodide, it was possible to reduce secretion volume and acid and pepsin output. Comparison of the two drugs showed that the reduction of secretion volume and acid output were of

Subject	Age	Weight	Duration of Symptoms	Date	Drug Dosage	Mean Hourly Values				Output: % Reduction			
						Vol. (ml.)	Free Acid Output (mEq)	Total Acid Output (mEq)	Pepsin Output (Units)	Vol.	Free Acid	Total Acid	Pepsin
		lb. kg.											
1	34	162 73·5	10 yrs.	10–11/3/50	—	150·3	10·72	11·93	No readings				
				21–22/3/50	Tr. bellad., 210 min.	51·9	1·48	2·46	9,300	61·6	82·3	74·7	43·7
				24–25/3/50	—	127·4	6·86	8·77	20,500				
				28–29/3/50	Hexamethonium, 100 mg. 3-hrly	45·0	1·26	1·97	4,130	66·7	85·0	80·3	75·0
				31–3/4/50	—	128·0	7·42	9·08	12,450				
2	39	145 65·8	15 yrs.	30–31/5/50	—	55·7	2·30	3·22	9,200				
				7–8/6/50	L-hyoscyamine, 7/100gr.	42·9	0.88	1·88	8,800	41·7	80·5	62·7	27·3
				13–14/6/50	Hexamethonium, 100 mg. 3-hrly	28·4	0·53	1·00	2,125	61·4	86·7	80·0	82·0
				15–16/6/50		91·2	5·70	6·84	14,800				
3	30	132 59·9	10 yrs.	20–21/6/50	—	94·0	7·99	9·20	11,900				
				27–28/6/50	L-hyoscyamine, 7/100 gr.	39·0	1·50	2·34	8,330	60·5	78·0	71·0	37·7
				29–30/6/50	—	102·0	8·57	10·03	No readings				
				3–4/7/50	Hexamethonium, 100 mg. 3-hrly	43·4	3·57	4·13	6,100	55·8	47·7	54·0	54·3
				6–7/7/50	—	99·0	3·94	5·08	14,860				
4	53	125 56·7	11 yrs.	21–22/7/50	—	148·0	10·2	11·9	22,110				
				24–25/7/50	Hexamethonium, 100 mg. 3-hrly	49·0	1·6	2·0	3,880	63·0	83·3	82·0	78·2
				25–26/7/50	L-hyoscyamine, 7/100 gr.	53·0	1·7	2·3	6,990	60·0	82·5	79·0	66·0
				28–29/7/50	—	118·0	9·2	10·3	12,980				
5	41	132 59·9	7 yrs.	20–21/11/50	—	92·0	2·7	3·85	13,980				
				21–22/11/50	Hexamethonium, 100 mg. 3-hrly	26·6	0·36	0·60	1,080	71·0	87·3	84·5	90·5
				27–28/11/50	L-hyoscyamine, 7/100 gr.	28·0	—	0·26	570	69·5	100·0	93·2	95·3
				30/11–1/12/50	—	86·0	2·96	3·85	8,960				

about the same order, but the reduction of pepsin output was greater with intramuscular hexamethonium iodide than with L-hyoscyamine or tincture of belladonna (one subject included in L-hyoscyamine results). The difference, however, is not statistically significant in so small a series.

Another point of interest is the return of the control values, after exhibition and withdrawal of the inhibitory drugs, to their former levels, demonstrating a lack of residual effect from the drugs. The control values, when averaged for the series, are remarkably constant.

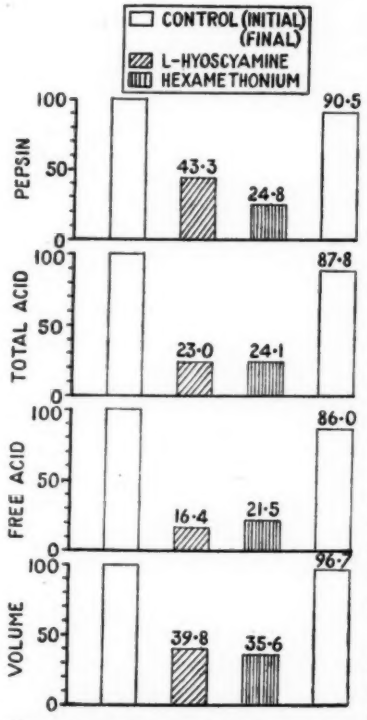

Chart showing mean outputs as percentages of initial control values in five subjects.

Effects on concentration are not shown, being unreliable, as no precautions could be taken to prevent swallowing of saliva, the subject usually sleeping for the greater part of the test; nor was biliary contamination a deterrent to examination of a sample. It was noticed, however, that the tendency was for higher individual hourly concentrations of pepsin to occur after L-hyoscyamine administration than after hexamethonium.

Bile tended to be present, as judged by a rough plussing assessment of degree of staining of samples, in greater quantity after giving hyoscyamine than after hexamethonium, but similar quantities were sometimes present on nights when no drug was given.

Discussion

Collections of interdigestive secretions have been criticized (James and Pickering, 1949). Despite discrepancies in control readings on individual subjects, when readings made before administration of drugs, and afterwards, are averaged for the five subjects, there is good agreement (see Chart). The importance of screening the intragastric tube fluoroscopically cannot be too strongly stressed. The difficulty of manœuvring the tube into position on occasions has to be experienced to be believed. In other secretion studies achlorhydria has resulted from imperfect placing of the tube, an acid juice being readily obtained when the tube was properly located. Since preliminary screening of the tube has been the rule, it has been found coiled in the fundus of the stomach on a number of occasions.

L-Hyoscyamine was studied mostly, as it is said to lack the central excitatory effects of atropine, the racemic mixture, but little difference in inhibitory effects has been noted between L-hyoscyamine and tincture of belladonna. Where one has been effective a comparable dose of the other has produced similar inhibition. Likewise, in one of two patients in whom belladonna lacked inhibitory effect on interdigestive secretion, L-hyoscyamine also was ineffective. During these studies the tube was not being screened, hence data are not given in this paper. It is possible, but unlikely, that the control collections were incomplete. Hexamethonium was not available for trial in these subjects.

There was little complaint of side-effects of either drug. One patient complained of headache, which disturbed sleep, after a maximal dose of L-hyoscyamine. As he had been investigated a year previously, and his limit of tolerance to belladonna was known, the dose was increased to maximum more rapidly than was

customary. He was the only patient, however, to feel the orthostatic hypotensive effect of hexamethonium, falling flat on his back on rising from bed, four hours after the last dose. All patients were warned not to leave their beds while receiving hexamethonium injections.

Belladonna, or its alkaloid, was given so early in the evening in order that there might be adequate opportunity for absorption of the drug before gastric suction was applied. The residue aspirated after an hour was not tested for unabsorbed belladonna alkaloids. Absorption of belladonna from the small bowel would continue after aspiration had been started. Therapeutically, smaller doses of belladonna should suffice to produce the symptoms of dryness of the mouth and mydriasis on waking, as the drug would be taken at a later hour. In most of the patients studied, data from all of whom are not given in this paper, the administration of belladonna, or its alkaloids, was not continued for any length of time, as it was necessary to withdraw the drug and demonstrate the return of the spontaneous secretion to former levels. However, the drug has been given for periods of many days to other patients to control interdigestive secretion, without ill effect. The use of intramuscular hexamethonium salts is limited to institutional treatment.

Conclusions

Adequate doses—larger than are normally used—of belladonna, or its alkaloids, orally, and intramuscular hexamethonium iodide produce substantial inhibition of interdigestive gastric secretion in patients with duodenal ulcer. The inhibition obtained compares favourably with a series studied by Clarke *et al.* (1947) before and after the operation of vagotomy. In 16 patients they found a reduction by a half of the average total acid output.

Summary

The effects of oral belladonna, or L-hyoscyamine, and hexamethonium iodide intramuscularly on interdigestive gastric secretion are compared.

Similar substantial reduction in secretion volume and acid and pepsin output is obtained by means of either drug. Results compare favourably with a reported series after vagotomy.

I wish to acknowledge much help from Dr. W. I. Card during this work and the preparation of this paper.

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MECHANISM OF THE RENAL EXCRETION OF METHONIUM COMPOUNDS

BY

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It has been reported (Milne and Oleesky, 1951) that in normal man hexamethonium bromide given intramuscularly is almost completely excreted in the urine in the 24 hours following the injection. Zaimis (1950) has also shown that in rabbits 60 to 70% of an intravenous dose of hexamethonium iodide is excreted in the urine during the next 24 to 48 hours. The following observations were made to find out in what manner the kidneys excrete hexamethonium bromide (C6) and pentamethonium bromide (C5). The clearance of these substances has been compared with the simultaneous clearance of inulin in man and experimental animals.

Technique

Clearances were estimated in two unanaesthetized hypertensive patients and in three subjects during varicose-vein ligation or herniorrhaphy under light ether or cyclopropane anaesthesia ; in three cats ; and in four rabbits anaesthetized with pentobarbitone sodium 40 to 60 mg./kg., or chloralose 75 mg./kg.

Inulin clearance was taken to equal glomerular filtration rate. An intravenous priming injection of inulin was given, followed by an intravenous maintenance injection delivered by an electrically driven syringe. At least half an hour was allowed for stabilization before clearance periods were begun.

The administration of C5 and C6 was not uniform. The two hypertensive patients had been on methonium compounds for several weeks before the day of the experiments, and a plasma and urine blank was therefore not obtainable. In these two patients 50 mg. of methonium compound was given intramuscularly 15 minutes before the start of the first clearance period, followed by an intravenous maintenance of 0.5–1 mg. a minute. In the three anaesthetized subjects C5 was given intravenously in divided doses, and clearance periods were begun 5 to 10 minutes after the last injection ; no C5 was given during the clearance periods. The cats and rabbits were given an intravenous priming injection of C6, 1 to 3 mg./kg., in divided doses, 5 to 20 minutes before the start of the first clearance period. Only three animals were given a C6 intravenous maintenance injection (16 μg. a minute) during the clearance periods.

A diuresis was promoted by a continuous intravenous injection of 8 to 12% mannitol in the anaesthetized subjects and experimental animals. In the two unanaesthetized subjects a brisk diuresis was induced by 1,000 ml. of water given by mouth an hour before the first clearance period. Urine was collected by urinary catheter in all instances, the bladder being washed out with saline at

the end of each clearance period. The duration of clearance periods was 10 to 15 minutes.

Heparinized venous blood was collected near the mid-point of each period for estimation of plasma inulin and C5 or C6. Protein precipitation was with cadmium sulphate (Goldring and Chasis, 1944), and inulin was estimated by the method of Roe *et al.* (1949). The plasma and urine methonium levels were estimated on the nictitating membrane preparation, in the cat, by close arterial injection into the superior cervical ganglion. The peripheral end of the cut cervical sympathetic nerve was stimulated continuously to give a constant and maximum retraction of the membrane ; untreated plasma and diluted urine were delivered to the superior cervical ganglion by a retrograde injection into the external carotid, which was ligated peripherally. The ganglionic block produced by methonium activity decreased the retraction of the nictitating membrane, and the extent of this relaxation was calibrated by injection of standard concentrations of methonium compounds. A description of this biological assay will be published shortly by Dr. W. D. M. Paton, who was very generous in teaching us the technique.

Results and Comments

The results are shown in the Table. The clearance figures are the average of two or three periods.

The Simultaneous Renal Clearances of Hexamethonium or Pentamethonium Bromide and Inulin

	Anaesthetic	Methonium Compound	Plasma Level C5 or C6 (μg./ml.)	Renal Clearance (ml./min.)		C5 or C6 / Inulin Clearance Ratio
				C5 or C6	Inulin	
Subjects						
1 ..	None	C5	7·2	51	57	0·9
2 ..	,,	C6	5·3	97	94	1·0
3 ..	Ether	C5	5·1	121	97	1·2
4 ..	,,	C5	3·6	154	110	1·4
5 ..	Cyclopropane	C5	5·1	62	61	1·0
Average						1·1
Cats						
1 ..	Pentobarbitone sodium	C6	2·0	7·8	6·8	1·1
2 ..	,,	C6	3·6	10·8	10·0	1·1
3 ..	Chloralose	C6	4·6	5·7	4·7	1·2
Average						1·1
Rabbits						
1 ..	Pentobarbitone sodium	C6	3·0	3·2	4·5	0·7
2 ..	,,	C6	12·5	7·4	5·3	1·6
3 ..	,,	C6	5·9	6·3	6·4	1·0
4 ..	,,	C6	6·4	5·0	3·4	1·4
Average						1·2

The average methonium : inulin clearance ratio is 1.1 in man and the cat and 1.2 in the rabbit. It is clear from these ratios that the renal excretion of C5 and C6 is mainly due to filtration, with some minimal excretion by the tubules. It follows, therefore, that the maintenance dosage of these methonium compounds should be proportionately less in cases in which the glomerular filtration rate is reduced.

Summary

The mechanism of the renal excretion of hexamethonium and pentamethonium bromide has been studied in man, the cat, and the rabbit by comparing their clearances with the simultaneous clearance of inulin.

The methonium : inulin clearance ratios were 1.1 to 1.2, indicating that the renal excretion of these methonium compounds is mainly due to glomerular filtration, with minimal tubular excretion.

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Medical Memoranda

Streptomycin and Friedländer's Bacillus

This case is of interest because it shows how a bacteriological investigation may be of value in guiding the choice of treatment.

Case Report

The patient, a middle-aged woman in good general health, had suffered from recurrent attacks of sinusitis in both left and right maxillary antra since 1937, when a left intranasal antrostomy and turbinectomy was performed. This operation was undertaken on the strength of a radiological abnormality found during a search for septic foci to account for a rheumatic episode.

The long-term result of the operation was not wholly successful and a variable amount of discharge had come from the sinuses ever since, with, from time to time, acute attacks of pain, headache, and sometimes fever. These had become more frequent recently, as many as a dozen having occurred during the past two years. The patient habitually treated such attacks with nose drops of a sulphonamide compound, and the acute condition usually cleared up in a few days.

In March, 1950, she developed one of her usual "acute" attacks of sinusitis on the left side. The attack failed to respond to sulphonamide drops, pain and headache remained, and the discharge from the nose became thick and yellow.

On April 17 a left nasal swab was submitted for bacteriological examination and a profuse pure growth of a Friedländer's bacillus was obtained. The organism was non-motile and capsulated, and had the following biochemical reactions after 24 hours' growth at 37° C.: Lactose − ; glucose A.G. ; mannitol A.G. ; sucrose − ; salicin A.G. ; dulcitol − ; maltose A.G. ; indole +.

Plate-sensitivity tests were performed, with the following results. Resistant: penicillin, sulphanilamide, sulphacetamide, methyl violet ; slightly sensitive: sulphadiazine, phenoxetol ; very sensitive: streptomycin.

On May 3 this organism was still present, and so were the symptoms. Meanwhile the patient had been using inhalants and decongestive drugs and twice-weekly short-wave diathermy had been started, all without effect. Indeed, a brief exacerbation of headache had following each diathermy session.

Treatment by direct attack against the Friedländer's bacillus was then considered. "Aureomycin" and chloramphenicol were not available at the time. Streptomycin was the available drug to which the organism was most sensitive, but it had the disadvantages of being likely to produce rapid development of bacterial resistance if used locally and of involving daily intramuscular injections and possibly toxic side-effects if used systemically. Accordingly it was decided to try first of all the effect of local treatment with phenoxetol, to which the organism showed some sensitivity.

A 2% solution of phenoxetol in physiological saline was used, a few drops being instilled into the nose four times daily. Unfortunately this solution caused smarting pain

(perhaps a solution incorporating procaine would have been more satisfactory), and we were surprised to find the patient persevering with its use for several weeks because she was certain that it reduced the amount and thickness of the discharge.

Swabs taken on May 15 while phenoxetol was being used showed Friedländer's bacilli still present but in reduced numbers. After it was discontinued swabs cultured on July 21 again gave a profuse growth of Friedländer's bacilli.

On September 9 the patient was seen by one of us (C. P. M.) at the Metropolitan Ear, Nose, and Throat Hospital. There short-wave diathermy was given daily for a week instead of twice weekly, but no improvement was observed.

On September 16 a course of intramuscular injections of streptomycin was started, 0.5 g. being given twice daily for 22 days as well as the short-wave diathermy. The patient complained of minor toxic symptoms but did not interrupt the treatment.

After a fortnight the nose began to clear, and by the end of the treatment complete relief of symptoms had been obtained. There remained only a very slight mucoid nasal discharge. The patient was free of headache for the first time in seven months. Nasal swabs were examined again on October 16, 26, and 31 and November 8, and no Friedländer's bacilli were isolated. The only organisms present were micrococci. (These, incidentally, were sensitive to streptomycin and so were probably picked up after the end of treatment.)

Comment

In this case it was well worth while to eradicate the particular infection concerned; and bacteriological tests were of help in indicating which antibacterial substances were likely to be effective. It would be optimistic to suppose that damaged sinuses which have been subject to recurring infection over a period of thirteen years will long remain clear; it is, however, reasonable to hope that subsequent infections may be with organisms less virulent and more easily dismissed.

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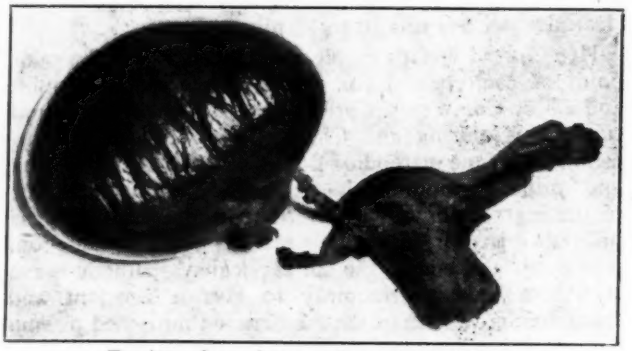
C. P. MALLEY, F.R.C.S.

Torsion of Ovarian Cyst in a Newborn Infant

The occurrence of ovarian cysts and tumours in the newborn is not common, but has from time to time been recorded (Downes, 1921; Dodek, 1933; Bulfamonte, 1942). There are, however, fairly numerous references in the literature to such cysts in young children, and it is likely that some of these have been present since birth. Torsion of an ovarian cyst at or near the moment of birth is a rare accident in the newborn, and among the many suggested causes of torsion of these cysts the process of birth has not been mentioned. A case similar to the one here described was reported by v. Franque (1900).

Case Report

A healthy woman aged 19, who had had one previous full-time normal confinement and no abortions, was admitted to hospital in premature labour in the 35th week of her pregnancy. After an easy labour lasting 7¼ hours she was spontaneously delivered of a female infant weighing 4 lb. 9 oz. (2,070 g.), the head being delivered in the occipito-posterior position. The baby was active at birth and appeared to be healthy. When it was about 6 hours old it was noted to be cyanosed, but no other abnormal physical signs were found. It was nursed in an oxygen tent, but its condition deteriorated and it died 22 hours after birth.



Torsion of ovarian cyst in newborn infant.

Necropsy showed the presence of a considerable degree of pulmonary atelectasis, and examination of the pelvic viscera disclosed a left-sided ovarian cyst 4 cm. in diameter. No further abnormality was found in the body. The cyst had undergone torsion, there being five complete turns in the pedicle, which consisted of Fallopian tube and meso-salpinx (see illustration). The left ovary appeared to be completely replaced by the cyst, no ovarian tissue being visible to the naked eye; the fimbriated end and outer half of the tube had undergone torsion with the cyst.

The cyst was dark purple in colour, and when opened was found to contain thin bloody fluid, but no actual gangrene was present. Histological examination of the cyst wall showed this to consist of fibrous tissue with a cellular lining, but owing to the degree of necrosis it was not easy to classify these cells. A few primordial follicles were visible in the cyst wall. Diagnosis of the type of cyst evidently lay between a cystoma simplex and a follicular cyst, more probably the former.

Comment

The case described by v. Franque was almost exactly similar to this one; the cyst in his case was 4 cm. in diameter; the pedicle was twisted three times, and the infant died 18 hours after birth. He considered that it was a follicular cyst. From the degree of necrosis present in the cyst wall in our case and from the clinical condition of the baby it seems likely that torsion of the cyst must have occurred about the time of birth.

We are indebted to Mr. J. McCorquodale for the photograph.

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One way of alleviating the present *x*-ray film shortage was revealed at an inquiry conducted by the L.C.C. public control committee into the running of the Hammersmith and District Foot Clinic when it was alleged that one of the partners pretended to take photographs when the apparatus was not working (*News Chronicle*, December 11). After a hearing which lasted nearly nine hours it was decided to revoke the clinic's licence on the grounds that the man was unsuitable to hold a licence. Giving evidence, his woman assistant told the committee that he had taken photographs more than 40 times without plugging the machine in properly; if a patient asked for a photograph he would wet an old film in the dark-room.

Reviews

GENETICS AND HUMAN RACES

Genetics and the Races of Man. By William C. Boyd, Ph.D. An Introduction to Modern Physical Anthropology. (Pp. 453; illustrated. £1 10s.) Oxford: Blackwell Scientific Publications. 1951.

Professor Boyd has devoted most of his research to following up the clue discovered by the Hirzfelds that the frequencies of the blood groups differ in various human races. With this background he has assessed the contributions of genetics to the study of human racial problems. The result is not very impressive. The author takes very great care not to go beyond the known facts, and remarkably few facts are known.

The human races differ in respect of hair form, and of skin, hair, and eye colour. There is no doubt that these differences are determined genetically, but startlingly little is known of how they are inherited. They also differ in respect of a number of immunological characters whose inheritance is understood. But these differences are never clear-cut in the sense that all members of one race have an antigen which all members of another lack. The sharpest differences of the kind are found where a substance such as A_2, which is present in about 10% of the English, is completely absent in the Chinese, Japanese, Pacific Islanders, the Eskimos, and the Amerindians (except for one blood from Chile and one from the Philippines, among some 4,000 tested). The Rh_0 (or cDe) type, which is present in 50% or more of several African races, is not a racial characteristic in this sense, being found in about 2% of the English. The skeletal differences between races are certainly more influenced by the environment, and much less is known about their genetic basis. It is still unsure whether the large differences in temperament and intellectual performance which certainly exist have any genetic basis at all, or whether they are wholly due, as they are certainly largely due, to differences in social environment. Probably the most important differences of all, which determine resistance to infections and to climatic conditions, are only just being investigated. Nevertheless, in a book of this size I think that the author might profitably have devoted a little more space to the discussion of the evidence for and against the view that racial differences in intelligence quotients are genetically determined.

There are other criticisms. The account of elementary genetics leaves something to be desired. "Probably no one has as yet seen an individual gene," we read on p. 45. On p. 43 we find a description of the effect of the gene "Bar" on the eye of *Drosophila melanogaster*. In fact every fly carrying this gene has an additional segment in the particular region of a particular chromosome where the gene was located on other grounds. In my opinion hundreds of people have seen this gene.

More serious is the author's failure to quote European workers. Whether the curtain which separates him from them is composed of iron, gold, or plutonium, its effects are drastic. Thus Chapter IV is largely devoted to a consideration of inbreeding, and does not mention Dahlberg's conception of isolates, nor Sjögren's demonstration of the effect of inbreeding in increasing the frequency of human recessive abnormalities, to mention only two contributions of the great Swedish school of human genetics. Incidentally, Table 12, which concludes this chapter, is wrong, unless the matings considered were of double, not single, first cousins. The work of Ladell and Schreider on temperature regulation in different races was probably published too late for Boyd to refer to it. But a glance at Cockayne's *Inherited Abnormalities of the Skin and its Appendages* would have enabled him to double the number of "Mendelian characteristics in man" listed in Table 40, and a survey of other European literature might have induced him to omit some of the characters included in this table. The reviewer certainly cannot complain of neglect by Professor Boyd; indeed, he is, if anything, over-quoted; but he can complain when on p. 137 an estimated mutation rate of 1 in 50,000 is given as 2×10^{-3}, and a later estimate of 3.2×10^{-5}, based on data from a different human population, is stated to agree better with mutation rates observed in other organisms. In fact it probably agrees rather worse. Similarly, on p. 147, Hogben is given the credit for a calculation originally due to Punnelt.

The book ends with two chapters on man's past and future. The future predicted is one of universal crossing between races, leading to a rather uniform brownish population largely of Asiatic and African origin. This may be true, but it is also possible that a new and scientific racialism may show that the different human races are on the whole adapted to the climates in which they live, and that steps will be taken to discourage such mixture without branding any race as inferior.

On the whole the book may be described as an honest attempt to state what the author believes to be true, and no more. It can be cordially recommended as an antidote to most other works on the same topic, which, to the reviewer at least, seem to go beyond the facts, a conspicuous exception, containing many data which supplement Boyd's, being Kherumian's *Génétique et Anthropologie des Groupes Sanguins*. Future research is likely to build on the small but relatively firm basis of data contained in it rather than on more attractive but less stable hypotheses. For this reason all readers who wish to follow the development of physical anthropology will do well to read it.

J. B. S. HALDANE.

SURGERY AND THE AUTONOMIC NERVOUS SYSTEM

La Philosophie de la Chirurgie. By Professor René Leriche. (Pp. 252. 400 francs.) Paris: Flammarion. 1951.

Many years ago René Leriche made the brilliant discovery that by injecting procaine into the site of a local injury many of the effects associated with the injury could be prevented. If, for example, the torn ligaments of a sprained ankle were injected, swelling of the tissues and effusion into the joint did not occur, pain was abolished, and recovery of function was rapid. This simple fact formed the basis of a life's work on the meaning and surgical importance of pain.

In this volume Leriche applies his conception to the whole field of disease and urges the great importance of the vegetative or sympathetic nervous system in a true appreciation of pathology. To him the local condition, whether an injury, an infection, or a tumour, is almost of secondary importance when compared with the resulting effects on the whole autonomic nervous system, and he expands his thesis to cover the whole field of surgery, the training of the surgeon, and his attitude to his patient. While fully appreciating a scientific study of

the patient, " the establishment of his clinical balance by means of curves, graphs, and figures," he asks us to remember that " the man on whom we operate is not a physiological machine. He thinks, he fears, his frame trembles, if he has not the consolation of a vision of sympathy. Nothing can replace for him a friendly contact with his surgeon, the exchange of glances, the feeling that he is taken in charge, with what appears to be the certainty of success. There is here something incalculable which we have no right to sacrifice."

This is a point of view which every surgeon will appreciate, but few would think of finding for it a scientific basis in the autonomic nervous system. Leriche supports his views from instances in his own vast experience and from a wide knowledge of the experience of others recorded in surgical literature. For him we owe our lives to our autonomic mechanism, which protects us at every turn from cold, fatigue, emotion, injury, infection, and all the chances of our daily life, and indeed forms the basis of our character and outlook.

He applies this conception not only to the whole field of surgery but to operative detail, to the training of the surgeon, and to the dim problems of the surgery of the future. It is a most original study, and those who have the good fortune to know Leriche will be grateful for a new insight into a charming personality. But there is no surgeon, young or old, who might not gain from the great experience, the wide outlook, and the deep wisdom which are here placed at his disposal.

HENRY SOUTTAR.

BREAST CANCER

Carcinoma of the Breast. By C. D. Haagensen, M.D. Fifth of a Series for the Early Recognition of Cancer. A Monograph for the Physician. (Pp. 120; 56 figures, several of which are in colour. No price.) New York: American Cancer Society, Inc. 1951.

The aim of Dr. Haagensen's book is to put before the medical practitioner, and through him before the general public, the most up-to-date information available about cancer of the breast, about its incidence, its recognition at an early and curable stage, and its treatment.

After a brief introduction, pointing out that the female breast is by far the commonest site for cancer in either sex, the author passes on to discuss diagnosis, a subject that occupies more than half the book. This section is admirable. An orderly routine is described that leaves nothing to chance, and he emphasizes the importance of inspecting and palpating both breasts and the whole upper part of the trunk with the patient standing, stooping forward, and lying with her arms in different positions, and with the underlying muscles contracted and relaxed. The many reproductions from photographs clearly illustrate the points made in the text.

The rest of the book is devoted to a critical discussion of the methods of treatment available, and the indication for each. It is interesting to note that the five-year cure rate obtained by radical operation has almost doubled since 1911, when complete records were first kept. The author discusses in some detail the contraindications to surgery, as well as its unique advantages in the early case. He concludes with a clear and balanced account of the use of endocrines in the late or recurrent case.

With most of his views British surgeons will find themselves in agreement—with his doubts about the value of transillumination, the condemnation of aspiration biopsy, and his advocacy of the use of frozen sections at the time of operation. With others they will feel less in accord—with his belief in the teaching of self-examination to patients, with his view that the knife is a good instrument with which to dissect areolar planes, with his statement that it takes five hours to do a breast resection properly, and with the place he allots to deep therapy. Dr. Haagensen states that " the inability of *x*-ray Roentgen-ray treatment to control the axillary metastases is an insurmountable objection to reliance on this method for cure." Edinburgh surgeons please note.

Everyone will profit by reading this book, and particularly those whose duty it is to teach the physical signs and the methods of clinical examination.

HENEAGE OGILVIE.

SUCCESSION AND CAUSATION

The Natural Philosophy of Plant Form. By Agnes Arber, M.A., D.Sc., F.R.S., F.L.S. (Pp. 246. £1 5s.) Cambridge: The University Press. 1950.

The appearance of this book is an event in the history of British natural science. For some thirty years Mrs. Arber has pursued highly specialized botanical, as well as philosophical, studies with thoroughness and ever-deepening insight. The book under review is the harmonious product of this two-fold pursuit.

It seems obvious enough, but is insufficiently recognized, that if we think in terms of cause and effect we must have some insight into the nature of causation. But this requires some philosophical training. It is the weakness of the " evolutionary " school, as it was of Darwin himself, that it is deficient in this training. Because of this deficiency, Professor Julian Huxley and others treat " evolution " as a " fact " and not as an assumption, or, rather, as a methodological presupposition.

Mrs. Arber warns biologists against confusing " the succession in time of a continuous series with causation." She adds that it " is necessary for the botanist to achieve the difficult task of realizing the organism as consisting of a unification of every phase of its existence from the fertilized ovum onwards; it *is a fatal error to see the individual as a summation of stages*" (pp. 162–3, italics our own).

Besides having a rare grasp of first principles (thanks to her philosophical training), Mrs. Arber is a wonderful observer. As such, she belongs to the great English tradition (to which Darwin also belonged). Her book will delight those botanists who are fascinated by the forms and symmetries of plants. It will also delight the philosophically inclined, who will, as they pass from chapter to chapter, see every detail of meticulous observation take on a particular significance which will merge into a significant whole.

" Contemplation "—or " Schauen," as Goethe called it—is the clue to Mrs. Arber's attitude. So far as the present reviewer is aware, she is the first English writer who does full justice to Goethe as the founder of modern morphology and the first to apply his method. She has convinced at least one reader that the present condition of biological science, which, in so far as it is not utilitarian, is dominated by progress without direction and accumulation without purpose, calls imperiously for this method which she has not only adopted but amplified and deepened.

Her book is itself like a flowering plant, an organic and beautifully integrated whole. Even if space permitted, it could not be reviewed by taking it to pieces. It must be read and studied as a whole—and as a work of authentic genius.

F. A. VOIGT.

SPLEEN PUNCTURE

Spleen Puncture. By Sven Moeschlin, translated by A. Piney, M.D. (Pp. 229; illustrated. £1 10s.) London: William Heinemann. 1951.

This is a translation, and at the same time a new edition, of a monograph first published in German in 1947. It is based on over 300 spleen punctures by the author, supplemented by a wide knowledge of the literature. The evidence shows that spleen puncture is free from danger if cases of haemorrhagic disease are avoided and if a careful technique is followed, of which the essentials are puncture in inspiration and to a predetermined depth.

Enthusiasm for special tests is always in danger of conceiving diagnosis in terms of a snapshot rather than a study of natural history, and, so far as haematological diagnosis is concerned, it is probably fair to say that spleen puncture, like lymph-gland puncture and hepatic puncture, merely supplements the information obtained by the blood count and sternal puncture. There are, nevertheless, conditions such as kala-azar, Gaucher's disease, and myelosclerosis in which it may be the first choice. Apart from its empirical use in diagnosis, however, spleen puncture may be of great value as a tool for research in the blood disorders, and Moeschlin has used simultaneous punctures of the spleen and the marrow, repeated at intervals, to study the effects of treatment with various agents in leukaemia.

This book, then, is not merely a description of a diagnostic method but a scholarly contribution to our understanding of the blood disorders. The translation by Dr. Piney is excellent, and the lay-out of the book, which is adequately illustrated and not too long, makes it easy to read.

L. J. WITTS.

BOOKS RECEIVED

Review is not precluded by notice here of books recently received

DeLee's Obstetrics for Nurses. By M. E. Davis, M.D., and C. E. Sheckler, R.N., M.A. 15th ed. (Pp. 673. 22s. 6d.) London: W. B. Saunders. 1951.

The Neuroses. By W. C. Alvarez, M.D. (Pp. 667. 50s.) London: W. B. Saunders. 1951.

The Medical Annual 1951. Edited by Sir Henry Tidy, K.B.E., M.A., M.D., F.R.C.P., and A. Rendle Short, M.D., B.S., B.Sc., F.R.C.S. (Pp. 420. 27s. 6d.) Bristol: John Wright. 1951.

Nervous Disorders and Religion. By J. G. McKenzie, M.A., B.D., D.D. (Pp. 183. 9s. 6d.) London: George Allen and Unwin. 1951.

The Unconscious Significance of Hair. By C. Berg, M.D., D.P.M. (Pp. 106. 15s.) London: George Allen and Unwin. 1951.

The Malthusian Controversy. By K. Smith, M Sc., B Com., Ph.D. (Pp. 350. 30s.) London: Routledge and Kegan Paul. 1951.

Panton and Marrack's Clinical Pathology. By H. B. May, M.A., M.D., M.R.C.P., and J. R. Marrack, M.A., M.D. 6th ed. (Pp. 512. 30s.) London: J. and A. Churchill. 1951.

Anatomy in Surgery. By P. Thorek, M.D., F.A.C.S., F.I.C.S. (Pp. 970. 180s.) London: J. B. Lippincott. 1951.

The Treatment of Varicose Veins and Their Complications. By S. Rivlin. (Pp. 56. 10s. 6d.) London: William Heinemann. 1951.

Gestalt Psychology. By D. Katz, Ph.D. (Pp. 175. 12s. 6d.) London: Methuen. 1951.

Black's Medical Dictionary. By J. D. Comrie, M.A., B.Sc., M.D., F.R.C.P.Ed., and W. A. R. Thomson, M.D. 20th ed. (Pp. 1,013. 30s.) London: Adam and Charles Black. 1951.

The Estate of Man. By M. Roberts. (Pp. 156. 15s.) London: Faber and Faber. 1951.

The Chemical Senses. By R. W. Moncrieff, B.Sc., F.R.I.C., F.T.I. (Pp. 538. 21s.) London: Leonard Hill. 1951.

Medicinal Chemistry. Edited by C. M. Suter. Vol. 1. (Pp. 473. 80s.) London: Chapman and Hall. 1951.

Post-Graduate Lectures on Orthopedic Diagnosis and Indications. By A. Steindler, M.D., F.A.C.S. Vol. 2. Section A: paralytic disabilities; Section B: static disabilities. (Pp. 198. 45s.) Oxford: Blackwell Scientific Publications. 1951.

Systemic Ophthalmology. Edited by A. Sorsby, M.D., F.R.C.S. (Pp. 712. 84s.) London: Butterworth. 1951.

Roentgen Manifestations of Pancreatic Disease. By M. H. Poppel, M.D., F.A.C.R. (Pp. 389. 77s. 6d.) Oxford: Blackwell Scientific Publications. 1951.

The Trial of Neville George Clevely Heath. Edited by M. Critchley, M.D. Notable British Trials Series, Vol. 75. (Pp. 239. 15s.) London: William Hodge. 1951.

Adding Life to Years. By Lord Amulree, M.D., F.R.C.P. (Pp. 100. 8s. 6d.) London: The National Council of Social Service. 1951.

The Quantitation of Mixtures of Hemoglobin Derivatives by Photoelectric Spectrophotometry. By F. T. Hunter, A.M., M.D. (Pp. 226. 63s.) Oxford: Blackwell Scientific Publications. 1951.

My Dear Holmes. By G. Brend. (Pp. 183. 10s. 6d.) London: George Allen and Unwin. 1951.

Speech Habilitation in Cerebral Palsy. By M. T. Cass. (Pp. 212. 20s.) London: Geoffrey Cumberlege. 1951.

Management of Celiac Disease. By S. V. Haas, M.D., and M. P. Haas, M.D. (Pp. 188. 40s.) London: J. B. Lippincott. 1951.

Baillière's Midwives' Medical Dictionary. Compiled by E. K. Worvell, S.R.N., S.C.M., M.T.D. (Pp. 296. 5s.) London: Baillière, Tindall and Cox. 1951.

Precepts and Counsels on Scientific Investigation. By S. R. y Cajal. Translated by J. Ma. Sanchez-Perez, M.D. (Pp. 180.) California: Pacific Press Publishing Association. 1951.

The Kidney. By Homer W. Smith, A.B., Sc.D., M.S. (Pp. 1,049. 100s.) New York: Oxford University Press. 1951.

Experiment in Dental Care. By J. T. Fulton, D.D.S. (Pp. 87. 5s.) Geneva: World Health Organization. 1951.

Die Psychiatrie der Hirngeschwülste. By Dr. H. Walther-Büel. (Pp. 226. 33s. 6d.) Vienna: Springer. 1951.

Über die Röntgenologischen Darstellungsmöglichkeiten des Weiblichen Genitalapparates mit Hilfe von Jodöl und Jodsol. By Dr. J. Erbslöh. (Pp. 74. M. 16.80.) Stuttgart: Georg Thieme. 1951.

Histologie und Mikroskopische Anatomie des Menschen. By Dr. W. Bargmann. Vol. 2. (Pp. 563. M. 45.) Stuttgart: Georg Thieme. 1951.

Wiederherstellungschirurgie des Gesichts. By Professor R. Perwitzschky. (Pp. 228. M. 34.) Berlin: Walter de Gruyter. 1951.

Deutsch-Englisches, Englisch-Deutsches Wörterbuch für Ärzte. By Professor F. Lejeune. Vol. 1: German-English. (Pp. 1,349. M. 24.) Stuttgart: Georg Thieme. 1951.

Insects as Human Food. By Professor F. S. Bodenheimer. (Pp. 352. 10 Dutch guilders.) The Hague, Netherlands: Dr. W. Junk. 1951.

Atti del Convegno Internazionale di Medicina del Lavoro, 1950. (Pp 369. 3,000 lire.) Milan: Clinica del Lavoro. 1951.

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AMENDING THE ACT

In order that the National Health Service may undergo a succession of modifications and become a viable thing instead of an administrative mess the medical profession will have to be unrelaxing in its efforts to reconstruct a service which is showing all the defects of a Governmental prefab. Doctors in all parts of the Service, especially the general practitioners, have since July, 1948, been working in an atmosphere of increasing frustration. No one can do his best in such an atmosphere, which, in short, can be summed up as one arising from an unsatisfactory relationship between employer and employed. The medical profession inevitably suffers from its inability to get, so to speak, to grips with its employer—a difficulty made greater by the changes in office consequent upon political reshuffling. And behind a succession of Ministers of Health there is the administrative department in the control of men of first-class ability who have to go rather against their training in their attempts to understand what is, at root, an intricate personal relationship—that between doctor and patient. The danger of all mechanisms, however ingeniously they may be constructed, is that they will crush the spirit of those caught up in their complicated movements. The medical profession should insist that what must come first are the essential needs of the human beings it cares for, and not administrative convenience or those maze-like conduits called "the usual channels." To safeguard the access of doctors to the water supplies of their existence it will be necessary to imitate the action of the British Army in Egypt by levelling some of the obstacles in their path. The Special Representative Meeting last week set about the first stage of an operation that will take some time to complete. The way had been prepared by the Amending Acts Committee and by the Council's first interim report based upon the Committee's recommendations. That the first stage of this operation was conducted so painlessly was a tribute not only to the chairman of the meeting but to the care with which the 400 and more representatives had studied the case beforehand.

In moving on behalf of Council the reception of the interim report, Dr. H. H. D. Sutherland stressed that this was a constructive effort on the part of the B.M.A. and that the object was to make the Service not only more harmonious but one in which all sections of the profession might co-operate with good will. It is necessary to emphasize his next observation—that they wish to make the National Health Service a great success. This is in direct continuity with the policy of the Association since the National Health Service came into being. And those who have to consider the many recommendations that were made last week—and will be made in the future—will surely bear in mind the guiding motive that lies behind the profession's constructive approach to a highly complicated problem—the complications being none of its own seeking or making.

The first motion before the S.R.M. was in favour of postponing decisions on the business before the meeting on the grounds that what was outstanding at the moment were the difficulties facing the general practitioner and the pending arbitration on his claims. This idea was echoed in a leading article in the *Manchester Guardian*, in which the view was expressed that whatever the case for the recommendations of the Council they did not seem to strike directly at the serious faults of the Service. The *Guardian* leader-writer summed these up thus: "The comparatively weak position of the general practitioners, the excess of work thrown on them, the poor co-operation in many regions between the three branches of medicine—general practice, the hospital service, and preventive medicine—deserve priority of attention." It is true that these are the outstanding immediate problems, but it is also true that they are at the same time being tackled by the Association. In any case it is not easy to see what bearing any recommendations for amending the Acts might have on raising the status of general practice. It is unfortunate that the profession has to deal with so many matters at one and the same time, but this is an inevitable consequence of the ill-advised action of the previous Government in trying to do too much at once.

The first recommendation passed was for the establishment of a National Health Service Court of Arbitration. The pros and cons of this vexed question have been discussed many times in these columns, but the long and short of it is that without an agreed mechanism of arbitration the collective bargaining through Whitley councils and committees will be without its essential complement. A series of recommendations were passed which aimed at limiting the power of the Minister. It must be recalled that in the many discussions before July, 1948, it was the powers of the Minister of Health that caused the

gravest alarm in the profession and to a large extent accounted for its opposition to the N.H.S. Acts. While the profession may to-day be assured of the benevolent intentions of the Minister, and while some may accept the argument that if he is to be ultimately responsible to Parliament for the running of the Service such powers must be in existence, even though they are unlikely to be used, the medical profession must see ahead into the future if it is to safeguard the interests of coming generations of doctors. To-day, then, the profession is being consistent in its demand for restriction of the powers of the Minister—which means, in effect, the powers of the permanent officials of the Ministry of Health—and the wise statesman, it may be hoped, will meet these requests in a spirit of trust in those who in the day-to-day practice of their profession have the vital responsibility of caring for the life and health of those millions who seek their services.

The S.R.M. passed some novel recommendations on the constitution of, and methods of election to, hospital boards and management committees. The aim of these is to put these important units in the hospital service on a democratic basis. The word "democratic" has now accumulated so many definitions as to become almost undefinable. It is not impossible for nomination to be made on a democratic basis. Nevertheless, free election is an essential part of what we hold to be democracy in Britain. And it is free election to management committees and hospital boards that the Representative Body wants. It may be difficult to define the electorate, but the S.R.M. is seeking to establish a principle and then to work out ways and means of seeing that it is acted upon. If it is true that many nominations have been made on a political basis it is at the same time necessary to recognize that politics may enter into an electoral machinery. Any method which will reduce political influence to a minimum must on that ground be preferred, and if those who have to work out the details of the new proposals can show that election will, in fact, do this, then they will have gone a long way towards substantiating their case. Apart from the structural considerations, the root of the trouble in the hospital service is the method of finance, devised, surely, to encourage extravagance and to discourage thrift. The S.R.M. advocated that block grants, similar to the university grants, should be paid to management committees, and that surpluses should be carried on from year to year. Unless hospitals can do this their finances will never be in a healthy state. The question of finance was brought up, too, by a recommendation which in effect said that payment of general practitioners should be by capitation fee; but this was not passed, and in its place the S.R.M. accepted the amendment which advocated that all other methods of remuneration apart from a whole-time salaried service and including payment by capitation fee and by items of service be left open. This certainly is something which needs to be examined with care and on the basis of experience in other countries.

The Christmas arrangements for printing have left but little time for an examination of many other important recommendations brought forward with a view to amending the National Health Service Acts. A full report of last week's debate appears in this week's *Supplement*, and no doubt the debate will be continued in our correspondence columns and elsewhere. Many of the resolutions of last week may be looked upon as controversial, but the profession should nevertheless feel that the B.M.A. has taken a first important step towards what all are agreed is necessary—the continued modification of the Acts in order to improve the Service.

MALE INFERTILITY

About 7% of all married couples turn out to be involuntarily infertile, and about one-third of these husbands show markedly defective spermatogenesis. Thus two or three husbands out of every 100 marriages are found, to their mortification, with a sperm picture which strongly suggests that it is their "fault" that their wives fail to become pregnant. The great majority of these husbands are prepared, indeed morbidly anxious, to leave no stone unturned to rectify the fault or to do penance for it, even to the extent of permitting and sometimes actually suggesting artificial insemination from a donor. These forlorn husbands are fair game for the charlatan, are willing guinea-pigs for the enthusiastic and experimentally minded investigator, and are not easily deterred from "trying anything once" by the pessimistic purveyor of poor prognostications.

It is, however, a depressing fact that over the past 25 years or so little has been added to our knowledge of the problem of male infertility from the point of view of either investigation or treatment, and in consequence many old wives' tales are still fashionable in giving advice to the childless husband, such as to restrict his smoking, to supplement his dietary protein and vitamins, to consent to temporary separation from his wife, to indulge in intercourse only once or twice

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[2] Heller, C. G., Nelson, W. O., Hill, I. B., Henderson, E., Maddock, W. O., Jungck, E. C., Paulsen, C. A., and Mortimore, G. E., *Fertility and Sterility*, 1950, **1**, 415.
[3] Heckel, N. J., Rosso, W. A., and Kestel, L., *J. clin. Endocrinol.*, 1951 **11**, 235.

in the month at the time of the fertile phase, or to take a holiday with his wife in a mountainous district or bracing climate. Fortunately most of these mysterious and unscientific remedies are not especially irksome, though many of them may strike the husband as being rather unnatural and some as being frankly ridiculous.

There has developed a tendency to regard the sperm picture as an accurate indication of the degree of male fertility, and to look upon a count of over 60 million sperms per ml. as indicating fertility, 20 to 60 million per ml. subfertility, and under 20 million per ml. infertility. Similar rigid and arbitrary standards have been applied to the volume, motility, viability, and percentage of abnormal forms. Furthermore, dogmatic pronouncements are frequently based on the study of one seminal specimen only, and unjustifiable assumptions are made of the efficacy of some therapeutic regime on the comparison of a single count before and after the period of treatment. Recent studies have shown, however, that the count may vary considerably both in fertile and in subfertile men from time to time, and it would appear to be unwarranted to make any assumption about either the degree of fertility or the effect of treatment unless three specimens have been examined. Moreover, it is becoming evident that one cannot predict the chances of parenthood at all accurately from a consideration of the number of sperms per ml. found in one or even in three or more sperm counts. For instance, studies of 193 husbands attending a certain fertility clinic whose wives became pregnant showed that 21% had a minimal count of less than 20 million and 8% a maximal count of less than 20 million. It may well be that a more important consideration than the count per ml. is the total number of actively motile sperms in the ejaculate, as suggested by Dr. Edmond J. Farris in this issue. However, this is not at the moment a conventional method of expressing sperm density, and it is a little difficult, therefore, to compare his standards for high, relative, and subfertility with the usual description of density and motility. Undoubtedly, as he points out, active progressive movement is a most important attribute for a sperm that has to undertake the somewhat hazardous journey through the female reproductive tract to reach its goal, the ovum, and achieve its object of penetrating and fertilizing it. But unfortunately there are no standard methods of expressing degrees of motility, from active to sluggish, and indeed it is not even very easy to count only the motile sperms in a low-power field. Thus it is customary to assume that the higher the density the greater the percentage of actively motile sperms, and to depend more on the count than on the assessment of motility as an expression of the fertilizing power of a seminal specimen. Certainly it is rare to find a good count with poor motility, and whenever such a combination is reported one should suspect some technical error in the method of collection of the specimen. For instance, when the specimen is collected in a condom motility is nearly always rapidly suppressed, so that by the time the specimen comes to be examined no motile sperms may be found. Should the specimen be submitted to an unduly high temperature, the sperms are rendered non-motile. It is of course quite unnecessary to take steps to keep the specimen warm until it reaches the laboratory, though it may be wise in cold weather to put it in an incubator at 37° C. for half an hour before studying the motility.

If it is so difficult then to assess "subfertility" it is likely to be almost impossible to determine the degree of effectiveness of any form of treatment, for even the achievement of parenthood in a man who has consistently shown grossly defective spermatogenesis does not necessarily prove that it is the result of treatment. Thus one is probably wise to be sceptical of claims made on behalf of various non-specific and empirical measures such as dietary adjustments and administration of drugs such as iron, arsenic, or thyroid extract.

Certain specific forms of treatment deserve careful consideration. It seems clear that for some reason still not satisfactorily explained it is necessary for a surprisingly large number of sperms to reach the ovum in order that one may successfully impregnate it. Animal studies suggested that the reason might be that hyaluronidase in sufficient concentration was required to dissolve the cement substance holding together the granulosa cells composing the corona radiata, and that the disintegration of this structure was essential before fertilization could occur. Supposing that each sperm carries its quota of hyaluronidase, a minimal number of sperms would be necessary to provide the concentration of hyaluronidase which would break down the coronal protection of the ovum. Whether or not this mechanism exists in the human species (and the finding of a sperm inside the ovum with the corona apparently intact makes it extremely doubtful), a satisfactory method of ensuring that exogenously administered hyaluronidase reaches the ovum in cases of defective spermatogenesis has not yet been devised. Nevertheless, if the concentration of a certain minimal number of sperms in the neighbourhood of the ovum is a prerequisite to fertilization, then any device which will bring this about in cases of defective spermatogenesis deserves earnest

study. This line of approach is the one which Farris discusses, and it would be useful if his work could be repeated in one or two of the specialized fertility clinics which are now established in this country. Until his results have received provisional confirmation, however, it would seem reasonable not to regard his methods as part of the routine treatment of male infertility, for it is one of the commonest observations of those who work in a fertility clinic that cold-blooded instructions about the time and frequency of intercourse may have devastating effects on the more timid of the two partners in the fertility problem. Some clinics find it difficult to persuade the husband to attend for an interview, or even to provide a seminal specimen, and rigid instructions about the timing of intercourse for post-coital tests not infrequently leads to temporary impotence. It would not therefore be wise to insist that every husband with defective spermatogenesis should achieve intercourse twice in 6 or 8 hours, or indeed that he should be continent for five days before the fertile phase.

Another method of approach is to study the microscopical appearance of the testis, by means of testicular biopsy, and the excretion of gonadotrophins and androgens in the urine. A method of classification of testicular deficiency has thus been evolved, and a group of cases of hypogonadotrophic eunuchoidism can be detected in which testicular biopsy reveals disorganization of spermatogenesis, lack of maturation, and sloughing of immature germinal cells into the lumen of the seminiferous tubules. The presence of germinal cells in various stages of maturation which might, with the appropriate gonadotrophic stimulus, proceed to normal sperm formation encourages the belief that adequate doses of pituitary gonadotrophin might be an effective form of treatment in this type of case. Attempts have been made to treat these cases with daily doses of a potent and partially purified hypophyseal extract from sheep containing predominantly follicle-stimulating hormone (F.S.H.), but difficulties have arisen on account of antihormone formation.[1] This, however, is a comparatively rare condition and can be recognized only by testicular biopsy and a low F.S.H. and 17-ketosteroid excretion in the urine.

Finally, the recent studies of Nelson and others[2,3] have shown that men with defective spermatogenesis treated with injections of 25 mg. testosterone propionate daily for one to three months showed arrest of sperm formation, sclerosis and hyalinization of the seminiferous tubules, and absence of Leydig cells accompanied by complete aspermia. Reassessment at a year to two years following treatment showed complete regeneration of the seminiferous elements of the testis, with normal sperm pictures. It would appear that the treatment with testosterone had originally suppressed the pituitary gonadotrophic stimulus to the testis, but that there had been a subsequent rebound effect, which resulted in complete restitution of normal testicular morphology and a normal "fertile" sperm picture. It is believed that this treatment is appropriate only to the group of cases that show a high F.S.H. excretion in the urine combined with hyalinization of the membranes of the seminiferous tubules and marked germinal defects, as revealed by testicular biopsy.

Thus progress is being made in a limited group of cases of male infertility, a group that can be recognized only by complicated investigations such as testicular biopsy and F.S.H. and 17-ketosteroid estimations, which can be dealt with only in very few highly organized fertility clinics. Promiscuous administration of gonadotrophic extracts and male hormone in the absence of such investigations is wholly unjustified. We would also venture to suggest that the implications of Farris's observations should be submitted to careful study in special fertility clinics before it is considered justifiable to introduce distasteful instructions to husbands on the intensive frequency or the timing of their acts of intercourse. Finally, it should be emphasized that there is at present no justification for claiming that any empirical and non-specific treatment is likely to lead to paternity, and that, in the absence of some specific treatment, no couple should be encouraged to attend a fertility clinic or to undergo investigation or non-specific treatment for longer than six or nine months.

EFFECTS OF INJURY

The remarkable advances in medical treatment during the last thirty years are mostly simple in essentials; many have been made as a result of accurate, quantitative, carefully planned observations and experiments on patients in the wards. Blood transfusion is among the most important of these advances. The overriding importance of blood loss in causing the circulatory failure which may endanger life after moderate and severe injuries is the main lesson of the clinical studies now reported by Grant and Reeve.[1] This work was carried out between 1940 and 1945. Of the patients under observation, 230 had injuries of the limbs and 80 had abdominal wounds; about half were civilians with injuries sustained in air-raids or accidents, the remainder being war casualties among our troops or civilians in Italy. Although the

[1] *Spec. Rep. Ser. med. Res. Coun., Lond.*, No. 277, "Observations on the General Effects of Injury in Man," 1951, H.M.S.O., London.

authors started with no preconceived ideas, the importance of transfusion to restore the circulating blood volume became clear as the work continued. The full benefits of transfusion were not obtained until three essentials were understood—the importance of giving enough blood (4–13 bottles for severe injuries), of starting soon after injury, and of transfusing rapidly (initially at a rate of one bottle every 5–15 minutes).

Throughout their report Grant and Reeve lay great stress on simple methods of assessment, available at the bedside. They classify the severity of injuries in terms of tissue destruction measured clinically by "hand volumes." An average hand or fist measures just under half a litre, and small wounds are those of less than 1 hand, moderate from 1 to 3, large from 3 to 5, and very large 5 or more hands. Blood loss was found to be correlated with these estimates—for example, 40% of the patient's whole blood volume was usually lost from large injuries, and 50% with very large injuries. Progress could be followed by the use of simple clinical criteria, a systolic blood pressure of less than 100 mm. Hg serving as the chief danger signal (except as an accompaniment to fainting, distinguishable usually by slowing of the pulse).

An essential part of this research was the measurement of plasma volumes with the dye T1824 (Evans blue) and of blood volumes calculated from simultaneous haematocrit determinations. Reeve discusses in detail the reliability of these results and shows clearly their practical value, even if the absolute figures may show some systematic bias in severely ill patients. A strong case is made for a more widespread use of simple plasma-volume determinations, especially when the condition of a patient after operation is doubtful. Normal blood-volume values can be estimated from a patient's height—again an easily made measurement even in acute illness. When loss of blood reduced blood volume by less than 20% the patients remained well enough to withstand even the further trauma of gentle operations. But when the blood volume fell to 70% of normal a critical state developed: systolic blood pressure dropped below 100 mm. Hg, and sometimes fell catastrophically when an anaesthetic was given or operation begun, when further minor blood loss occurred, or even when the injured areas were disturbed in the course of clinical examination. Yet adequate transfusion appeared to restore most of these severely injured men to a state in which they could withstand all these procedures with as little disturbance as those who had lost only trivial quantities of blood.

Grant and Reeve's careful observation of their patients during transfusion, operation, and postoperative treatment adds greatly to the force and interest of their work. In a sense each procedure can be regarded not only as an essential part of treatment but also as an experiment, indicating how a patient injured to a varying extent responds. Naturally each man was given the best treatment that was available and understood at the time. But early in the war the need for large quantities of blood was not appreciated, and it was possible in retrospect to compare the survival rates and clinical course of patients whose blood volumes remained severely reduced with those of patients more adequately restored. Such arguments from experience are convincing.

Included in the ancillary information collected in this report is a full description of reactions to transfusion. These are most undesirable, not only because they are an additional danger but also because they often obscure the clinical picture. The authors also investigated some of the special syndromes of abdominal injuries, such as salt deficiency. Their findings in these and other fields should encourage others to follow up this notable contribution to clinical science by continuing investigations under the relatively easy conditions of peacetime research.

LORD ADDISON

Medicine may well be described as a career open to all the talents, for through its portals have passed many men who have graced the arts, have become dramatists, poets, novelists, philosophers, politicians, and statesmen. Lord Addison, whose death we mourn, will be thought of now by his chosen profession as the professor of anatomy who in the latter years of a long and fruitful life became the statesman who won in the House of Lords a respect that transcended party differences. In the 41 years which have passed since he entered the House of Commons as a Liberal Member he filled many ministerial posts, and as the last President of the Local Government Board and the first Minister of Health in 1919 he symbolized in his person the revolution in the organization of medical services begun in 1911 and given a sharp turn by the N.H.S. Acts of 1946 and 1947. It was when he was Minister of Health that there occurred what has been described as the "tragedy of his career"—his alleged failure to grapple with the problem of providing houses for the men who had come back from the war. After losing his seat in the General Election of 1922 he joined the Labour Party, and in its fluctuating fortunes since then he avoided the doctrinaire extremes of some of its leading figures.

But it is not of the politician that the medical profession thinks to-day: it is of the man nurtured in its traditions and holding fast to them, a man level-

headed and robust in physique and character, a man, moreover, who through the second 40 years of his life as a politician and statesman retained an abiding affection for his first love—medicine. He seemed, indeed, to be happiest at the many dinners he attended at the Royal College of Surgeons, when he was so often reminded of his eponymous contribution to anatomy—Addison's plane. A Lincolnshire farmer's son who became a professor of anatomy and the first medical man to be admitted a Knight of the Garter, Addison has adorned our profession and shown by his notable career that English life always has room within its generous framework for those who by the full exercise of their native talents can rise to the highest positions in the State.

EPIDEMICS OF CONGENITAL DEFECTS

The observation that deafness and other congenital defects could on occasions be associated with attacks of rubella in the first three months of the mother's pregnancy raised several important questions. For example, can congenital defects in the child be caused by other illnesses in pregnancy, and what proportion of affected mothers give birth to defective infants? Study of the annual incidence of congenital deafness, reported by Lancaster in this *Journal* last week, provides strong evidence that rubella is the only important epidemic cause of deafness in Australia. From the records of institutions for the deaf and dumb it is apparent that the years 1899, 1916, 1924–5, 1938, and 1940–1 were epidemic in regard to the number of births of deaf infants; moreover, within these years the greater number of defective births occurred in March, April, and May, while the births were spread evenly throughout the twelve months in non-epidemic years. In the recent epidemics of 1938 and 1940–1 direct evidence has been obtained of the connexion between rubella and the birth of deaf children; Lancaster has now shown that the epidemics of 1899 and 1924–5 were also preceded by epidemics of rubella the year before. It is true that the epidemic of 1898 was contemporaneous with an epidemic of morbilli, but the consistency with which rubella has been observed in the other years (with the exception of 1915), and the absence of any epidemic of deafness associated with a pure epidemic of morbilli, make it probable that rubella was the major factor. If this is so it would appear to have been the cause of about 20% of all congenital deafness in Australia.

The inverse question of the frequency with which rubella can produce defects in the infant has, as yet, received no firm answer. To provide one a forward mode of inquiry is essential. The difficulty is that the occurrence of rubella in a pregnant woman is so rare an event that no one observer is likely to see any significant number, nor is it easy to arrange for individual notifications. Ober and his colleagues[1] traced 49 instances of rubella in pregnancy from 35,000 notifications of the disease and obtained evidence that four out of nine children born alive to mothers who had rubella in the first two months of their pregnancy were defective. However, half the women they wrote to for information failed to reply, so that the true proportion affected may have been considerably different. Hill and Galloway[2] collected information from approved societies operating under the National Health Insurance Acts before July 5, 1948. They were notified of all women who drew maternity benefit within one year of drawing sickness benefit for rubella or morbilli. In two years they received only 22 notifications; of the two women contracting rubella in the first two months of pregnancy one gave birth to a child with a patent interventricular septum, and the child of the other died of pneumonia aged 5 weeks without having had a special investigation. No defective children were born to women who had contracted rubella later in pregnancy or to any of those who had contracted morbilli. With the greater field provided by the present national insurance system it should be possible to obtain, in time, data about the incidence of any defect in relation to all possible maternal illnesses. Measles, mumps, and influenza have all been suggested as being of possible importance. Meanwhile studies of the type reported by Lancaster are of the greatest value in indicating the potentially dangerous diseases. It is chastening to note that evidence of the epidemic relations of a defect which had until so recently been regarded as accidental was available in census reports and institutional data for anyone who cared to look for it during the last 50 years.

1 *Amer. J. publ. Hlth*, 1947, **37**, 1328.
2 *Lancet*, 1949, **1**, 299.

NEW LIGHT ON OBESITY

The normal pattern of subcutaneous fat distribution in children and adults has recently been described.[1] Surprisingly, it is similar for all sex and age groups. The fat layer is thickest over the thighs, buttocks, the front of the abdomen, and over the back of the neck and upper arm; and thinnest over the extremities. This pattern is not obtrusive in a person of normal weight, but, as the thickness of fat increases, the shape of the bone and muscle mass becomes masked by the fat layer, which now has sufficient depth to present[2] as "girdle obesity" with a "buffalo hump" and "sparing of the extremities." In detail the pattern is identical in boys and girls until the growth changes of puberty, when small differences develop along divergent lines. The biggest difference between men and women is that women have 1.25 times as much fat on their legs as men do, in proportion to the total amount of fat. However, a striking difference exists between the sexes in the amount of fat stored, for at all ages females of average weight have about twice the thickness of subcutaneous fat carried by their male counterparts.

This pattern is the same for the skinny, the normal, and the grossly obese.[2] As fat becomes available for storage it seems to be taken up equally by all the fat-

1 Edwards, D. A. W., *Clin. Sci.*, 1951, **10**, 305.
2 —— ibid., 1950, **9**, 259.
3 —— *Proc. roy. Soc. Med.*, 1951, **44**, 904.
4 —— *Clin. Sci.*, 1951, **10**, 317.

storing cells in the body,[3] whether in the subcutaneous tissue or between the cardiac muscle fibres; apparently no new cells are developed, so that the size of an individual fat cell is a measure of the total amount of fat in storage.

A local change in the number of cells occurs in lipodystrophy when all the fat-storing cells disappear, and in lipomatosis when new fat cells are developed.[3,4] Both these changes produce obvious differences in the distribution of fat, for in lipomatosis the new and the old cells contain the same amount of fat, storing and releasing it at equal rates. Once the new distribution of cells is established, the new pattern of fat distribution is constant, however fat or thin the person becomes.

Unilateral muscle wasting resulting from nerve injuries, poliomyelitis, and progressive muscular atrophy does not cause changes in fat distribution, nor does unilateral sympathectomy.[1] The pattern is constant during and after pregnancy, and a group of obese children who had been described as having Fröhlich's syndrome had a normal distribution of fat. The appearance of the external genitalia in these children resulted from fat pushing out the skin whilst the genitalia themselves, attached as they are to the pubic bone, were left behind and overgrown.

It is easy to fit all these phenomena into a simple story but difficult to prove the explanation. The classical "endocrine" distribution of fat is clearly the normal pattern blown up to visible dimensions, while the absence of any change in pattern during pregnancy suggests that hormones must have little effect on fat distribution: the changes in distribution at puberty need only imply a manifestation of a growth pattern laid down many years before, paralleling the differences between men and women in skeletal and muscle mass. The probability is that no internal secretion can directly produce a local change either in the number of fat cells or in the amount of fat in each cell. Whether it has arisen normally or abnormally, a cell that has acquired the capacity to store fat will take up or give up fat at the same rate as all the other fat-storing cells in the body, unless mechanical forces bar the way.

VENEREAL DISEASES IN THE COLONIES

It took a world war to bring home the importance of venereal and paravenereal diseases in the Colonies and the toll they are taking of human health. In few places in Africa can any firm estimate be made of their incidence, but there can be little doubt that next to malaria they account for more invalidity and more human suffering than any other disease. Rae,[1] for example, states that in 1908 in some areas syphilis affected 90% of the population, Clarke[2] estimated the incidence of new cases of gonorrhoea in males in Lagos to be 110 per 1,000 per annum and in West African soldiers to be 600 per 1,000, and McElligott[3] found that 30% of cases of insanity in a hospital at Kampala were due to syphilis; others who have investigated and stressed this subject are Willcox[4] and Lees.[5] Gonorrhoea is a common cause of urethral stricture in males and of sterility in females. Syphilis must be responsible for many disastrous pregnancies (though curiously enough congenital syphilitic infants are rarely seen in West or East Africa), and for much skin and bone disease, as is yaws. Chancroid causes much mutilation of the genitalia. Gonorrhoea has no doubt been prevalent in many Colonies from time immemorial, but syphilis on any scale is of comparatively recent introduction.

Several factors are responsible for the increase of venereal diseases in recent times. Industrialization brings large numbers of men from their native areas to the large towns; separated from their wives and families and no longer subject to tribal customs and taboos, they quickly fall a prey to prostitutes. Improved communications entail greater movement of populations, and so the diseases are spread far and wide; they are everywhere much more prevalent in sea ports and large towns than in rural areas. Moreover, many males when they return from industrial areas to their tribes carry disease back with them and infect their wives.

Treatment presents an almost insoluble problem which can be tackled effectively only in two ways. A long-term policy of social betterment and education is one, but entails a raising of social standards, improved housing, and general education. The other, treatment and observation of all infected persons, is virtually impossible under present conditions owing to shortage of medical man-power and medical establishments, to the great distances which many patients have to travel, and even more to the fact that few patients are willing to attend after signs and symptoms have disappeared.

As a short-term policy mass treatment, as is now being carried out in Haiti and elsewhere under the auspices of W.H.O.,[7] seems the most practicable method. Fortunately the most prevalent diseases are syphilis, yaws, and gonorrhoea, and all three react well to penicillin—the suggestion of Willcox that all persons suffering from these diseases should be treated with 2.4 mega units of repository penicillin in a single injection seems to be a sound one. By this means a large proportion of cures should be obtained in early cases. This could hardly be so in late cases, but at least the chain of infection should be broken. Such a scheme would involve the formation of numbers of mobile teams consisting of medical officers, orderlies, and nurses, provided with all necessary diagnostic and treatment facilities. The chief difficulties would be shortage of medical officers and money, and it seems likely that only an organization such as W.H.O. could hope to carry it out successfully.

1 *Brit. J. vener. Dis.*, 1951, **27**, 118.
2 Ibid., 1951, **27**, 130.
3 Ibid., 1951, **27**, 122.
4 *S. Afr. med. J.*, 1951, **25**, 501.
5 *Brit. J. vener. Dis.*, 1951, **27**, 127.
6 Ladkin, *E. Afr. med. J.*, 1951, **27**, 467.
7 Guthe *et al.*, *Brit. J. vener. Dis.*, 1951, **27**, 1.

KING'S DOCTORS HONOURED

The King conferred on December 14 the honour of knighthood on Mr. C. Price Thomas, F.R.C.S., and Dr. Geoffrey Marshall, F.R.C.P., and invested them with the insignia of Knights Commanders of the Royal Victorian Order.

REFRESHER COURSE FOR GENERAL PRACTITIONERS

LEUKAEMIA—I. CLINICAL FEATURES AND DIAGNOSIS

BY

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In an average general practice a man may well work for twenty or thirty years and never meet with a case of leukaemia of the classical type, such as his student memories would associate with an enormous spleen and a visual picture of the spectacular appearance of a blood film, the last perhaps being one of the few unforgettable relics of a practical haematology class. However, the chance of such an encounter has increased, since there is unfortunately no doubt that this dread and fatal disease is far more common than it was twenty years ago, and this not simply because types other than the classical one have come to be recognized.

In some forms there are neither the gross enlargement of the spleen or glands nor the unequivocal and striking changes in the peripheral blood. Indeed, commonly, there is in fact no "leukaemia" or "white blood" arising from a vast excess of leucocytes. Rather is the total of leucocytes not greatly increased or sometimes quite grossly reduced, giving rise to the paradoxical descriptive title of "aleukaemic leukaemia"—a title which appreciates the fundamental relationship with the classical form with regard to course and prognosis, but emphasizes the absence of the leukaemic blood picture. It is therefore interesting, and even justifiable, to speculate whether indeed the "leukaemia" of the disease is anything more than a symptom, since the disease can run a similar course without such a symptom even presenting. If this be so, then all methods of treatment designed merely to reduce the leucocyte count—namely, to effect haematological improvement—would seem to be no more than symptomatic, as they do not strike at the root of the disease. At the outset it is important to appreciate that the reduction of the leucocyte count of the peripheral blood, though often symptomatically beneficial, does nothing towards controlling the disease process. It is also important to know that similar clinical states and suggestive, even highly suggestive, blood pictures caused by certain infections and other primary conditions may closely imitate leukaemia and give rise to the so-called "leukaemoid" blood picture. In these states the prognosis is not necessarily serious, whereas in leukaemia it is inevitably fatal. It is therefore a fundamental rule never to make a diagnosis of leukaemia until the evidence is so unequivocal that no other alternative is possible.

Types of Leukaemia

From the aspects of diagnosis, prognosis, and treatment the leukaemias are best classified on a simple clinical basis as acute, subacute, or chronic, according to the urgency of symptoms, the degree of toxaemia, the fever, the prostration and exhaustion, all of which are prominent in the acute phases or types, whereas symptoms may be minimal or even quite unnoticed when the disease is chronic. Prognosis and response to treatment are inversely proportional to the degree of acuteness of the process.

On the other hand, from the academical or haematological aspect the disease can be divided into very many types. The precursors of each or all of the leucocytes which are found in normal blood may dominate the blood picture and so give rise to named types such as myeloblastic, myelocytic, lymphoblastic, lymphocytic, monoblastic, and monocytic. Numerous atypical forms also occur—for example, eosinophilic leukaemia—whilst allied diseases such as lymphosarcoma provide categories of their own. From the general aspect the main features of these anomalous types are most easily comprehended by their symptomatology.

Clinical Features

Leukaemia is a disease with protean manifestations. Numerous other diseases may be imitated and symptoms may present in any system or in any part of the body. This is because of the basic pathology whereby the mobile leukaemic cells infiltrate all the tissues of the body and, in some sites, may undergo proliferation. The leukaemic infiltration may be gross, thus accounting for enlargement of organs and pressure symptoms, or moderate, or it may be so minimal in some leukaemic states that pathologists even argue about the diagnosis. A leukaemic patient may therefore present at almost any of the special departments of a large hospital, for example, with neurological lesions, Ménière's syndrome, dermatological manifestations, dental trouble, visual changes, bone and joint symptoms sometimes resembling acute rheumatism, haematuria, purpura, abdominal tumour, glandular enlargement, bronchitis, and, indeed, what you will. It is, however, quite possible to select from this difficult and diverse medley of symptoms certain salient features or suspicious findings which bring the diagnosis within the realm of possibility and which certainly justify an examination of the peripheral blood—itself usually sufficient—if not the unequivocally diagnostic, but more extensive, operation associated with examination of the marrow.

Of general symptoms, those which most commonly present arise from the gradually increasing anaemia, which is such a feature of the disease, or the enlargement of the spleen (perhaps noticed or perhaps giving rise to painful traction) or glands. As to the anaemia: any complaint of increasing lassitude, fatigue, distaste for work, lack of energy, inability to concentrate, and, in advanced cases (those who will not readily admit disability), a shortness of breath are all worthy of a blood examination whether or no the spleen and glands are enlarged. This symptom may be the prelude of the simple chronic type, or it may be the history given when the doctor is called to the acute case—that is, one presenting with sudden purpura, gingivitis, stomatitis, fever, toxaemia, and other distressing symptoms. Any haemorrhagic manifestation, be it purpura, bleeding gums, haematuria, haematemesis, or haemoptysis, is worthy of

investigation by a blood examination, especially if the symptom is accompanied by asthenia or fever, or toxaemia.

Lesser degrees of gingivitis and stomatitis found in the chronic forms of leukaemia are perhaps the signs most worthy of suspicion, but are most frequently disregarded; all too often the patient is referred to a dental surgeon for local treatment. This is especially so when the manifestation is no more than a painful swelling of the gum around one tooth, usually a molar or premolar, suggesting a rather diffuse "gumboil" requiring treatment by tooth extraction. Thereafter, the socket does not heal, the patient gets worse, and is eventually discovered to be a case of leukaemia. This insidious presentation with a localized gingival swelling is most common with the monocytic type of the disease, a type which is not very amenable to the orthodox lines of treatment. The lesson to be learned from this knowledge is that any inflammatory, ulcerative, or necrotic lesion of the mouth, pharynx, or gums is worthy of investigation by a blood examination. The diagnosis may not be leukaemia, but this should be excluded, and in any case the examination may reveal a condition such as agranulocytosis, or a blood response suggestive of some particular infection. Splenic or glandular enlargement may be noticed by the patient, the former on account of increasing girth or because of pain from traction. On the other hand, these classical signs and symptoms may be entirely absent, especially in aleukaemic types of the disease, which, indeed, may be extremely insidious in onset.

In brief, most cases of the chronic types of leukaemia will present complaining of some symptom arising from the accompanying anaemia, and this is usually associated with splenic and glandular enlargement, which may have been noticed by the patient or may be elicited at the clinical examination. Gingivitis, stomatitis, or pharyngitis are also common, whilst Ménière's syndrome does not always need the opinion of an otolaryngologist.

The presentation in the acute disease falls into a class by itself, though often the final compelling features in someone in the full tide of his powers have been preceded for weeks or months by a feeling that all is not well, of increasing weakness, lassitude, fatigue, and depression. But suddenly there appears some haemorrhagic symptom, especially widespread purpura and, often, an offensive necrotic stomatitis and gingivitis, accompanied by high fever and a profound degree of toxaemia, which may kill the victim in as short a time as a week. Purpura, fever, toxaemia, and stomatitis should be sufficient warning that what is being witnessed is probably the final phase of an inevitably fatal disease, the nature of which can be readily established by a competent blood examination.

But the most searing tragedies arise in infancy, childhood, and adolescence, since the onset is often so dramatically sudden and the course unbelievably rapid. Any persistent, unexplained, and intractable anaemia, especially in childhood and adolescence, should lead to a suspicion of leukaemia. Nor should the suspicion be dismissed until one, and sometimes more than one, marrow sample has ruled the diagnosis out of court. In youth the disease may closely imitate acute rheumatism, with fever and toxaemia associated with swollen and painful joints caused by leukaemic infiltration.

At the other end of the scale the clinical picture in the aged may be unbelievably symptomless even with grossly enlarged glands and spleen. This is particularly so with the lymphatic type, which in the sexagenarian or older person may produce neither anaemia nor other prominent symptom, but may occasionally give rise to remarkable dermatological manifestations, such as the appearance known as *homme rouge*, which are, unfortunately, usually associated with intolerable itching. These very chronic types in the elderly and aged often persist for years, with or without treatment, and the subject may well die of some other disease without ever having exhibited any of the unpleasant or progressive or dangerous symptoms of leukaemia itself.

A rapidly growing tumour may be the first thing to be noticed in certain forms of leukaemia, as well as in lymphosarcoma. The latter appears to be an allied disease in which the histology of the affected glands is indistinguishable from leukaemia, though there may be no leukaemic blood changes, at least at the onset. However, most cases of lymphosarcoma eventually develop a leukaemic blood picture in the terminal phases, and this final event seems sometimes to be encouraged by radiotherapy.

Uncommon forms of leukaemia include chloroma, in which the local tumour arises beneath the periosteum of the bones, especially of the skull and thorax, and Mikulicz's syndrome of bilateral enlargement of the salivary and lacrimal glands.

Nature of the Disease

Because leukaemia may appear unexpectedly and suddenly or, in contrast, with great insidiousness at all ages, but most dramatically in the young, and most commonly in those who are in the full tide of their powers, the doctor is liable to be closely questioned about the nature of the disease, why it has arisen, and whether it is infectious or inheritable. Most of these questions are unanswerable.

In the *International Statistical Classification of Diseases* leukaemia is placed among the malignant neoplasms of lymphatic and haemopoietic tissues, and this probably provides the best answer to the laity in the present state of knowledge of the disease, since they can comprehend what is meant by a malignant or cancerous process and can appreciate not only its prognosis but also that little or nothing is known about its cause. There is no evidence whatever of the disease being infectious. The intravenous injection of leukaemic blood in human patients has not carried the disease, and all attempts to transmit it to lower animals by blood or by tissue have failed. As with almost all diseases, there have been rare cases of leukaemia in families, but the evidence for a direct transference of the disease in the human subject is not nearly strong enough to exclude coincidence.

Further evidence against the infectious nature of leukaemia is to be found from studies of the disease in infants and mothers. Thus, a leukaemic mother gives birth to healthy children, and no infant developing leukaemia in the first few months of life has been found to have leukaemic parents.

There is, however, one hazard of life which seems to contribute to the incidence of the disease—namely, overexposure or injudicious exposure, or even exposure intermittently over long periods of time, to *x* rays or

irradiation, the very means which, in graded and calculated doses, are used in an attempt to control the disease. Leukaemia is many times more common in physicians who practise radiology than in their colleagues.

Prognosis

Leukaemia is inevitably fatal with the methods of treatment so far available. Nor do these methods of treatment appear to prolong life to any material or appreciable extent. Much can be done, however, to improve efficiency and to relieve distressing symptoms, whilst it would be unthinkable to abandon all forms of treatment merely because the disease is incurable. Once the diagnosis is made the most difficult problem is to estimate the duration of life. Certain rough rules can be applied, but even these are not absolute, for they take no account of sudden remissions, or, equally, of sudden exacerbations. Thus, patients with acute, subacute, or chronic types may be expected to live for weeks, months, and years respectively. A case which is acute from the outset, with the exception of children, rarely lives for more than a few weeks and does not usually enjoy a remission, whereas the subacute case is more likely to do so. The average chronic case of myeloid leukaemia lives for two to three years, but it is most unwise to promise this time, since it is not often known exactly how long the disease has been in existence, and the intrusion of an unpredictable exacerbation can upset all estimates. It is as well to bear in mind that once haemorrhagic symptoms have appeared (and a frequent and ominous one is haematuria) the end is not far off. An old person with chronic lymphatic leukaemia may live for ten or more years, with or without treatment, and frequently dies of some other disease.

Pregnancy aggravates the leukaemic process; spontaneous abortion, likely to be followed by a fatal haemorrhage, is common. On the other hand, a leukaemic woman may give birth to a healthy child, and if pregnancy occurs there is no reason to terminate it.

Differential Diagnosis

In differential diagnosis the mind may naturally range over a long list of conditions in which splenic or glandular enlargement is found with or without anaemia, and some of these have a superficial clinical resemblance to leukaemia or a haematological picture which arouses suspicion. Most, if not all, can be confidently disposed of by an efficient marrow examination, for it is in the marrow that the leukaemic process invariably starts, and it is there that the disease has usually existed for months, or longer, before it is clinically revealed. The taking of a sample from the marrow should always be entrusted to an expert haematologist, and should not be undertaken by those who are not experienced. The so-called leukaemoid blood pictures which are associated with frank infections, especially in children, usually present no difficulty, with the possible exception of some virus infections, particularly the glandular fever or infectious mononucleosis group, and, rarely, with certain types of acute tuberculosis. A competent haematologist should have no real difficulty in differentiating the peculiar cells of glandular fever from true leukaemia, even though the Paul–Bunnell reaction is negative, and, if in doubt, a marrow specimen should make the diagnosis clear.

From the clinical aspect the doctor can be comforted by the fact that even the severest forms of glandular fever (including the anginose type with extensive and suggestive oral lesions) are unaccompanied by significant anaemia, or at least not by any anaemia of the severe grade, which is almost invariable with febrile toxic acute leukaemia. Likewise, with Vincent's infection of the gums and pharynx, when gingivitis may, similarly, raise the suspicion of leukaemia. Some of these cases may have peculiar blood changes, but not of a degree which should lead to confusion with leukaemia.

The most interesting, and, at the same time, the most difficult leukaemoid diseases, especially with regard to blood changes, are the conditions which give rise to so-called "leuco-erythroblastic anaemia." This descriptive term does not designate a specific disease. It means no more than an anaemia, which may be quite slight, associated with the presence of nucleated red cells (erythroblasts) and a few primitive leucocytes in the blood. It arises from a disturbance of the marrow due usually to a neoplasm in bone or to a secondary neoplastic deposit such as occurs quite commonly when the primary growth is in the prostate, ovary, breast, or thyroid. The tracking down of the primary cause may be tedious and sometimes quite unsuccessful during life, but a marrow examination should exclude all question of leukaemia. As would be expected, a similar suspicious blood picture arises with the uncommon idiopathic myelosclerotic and osteosclerotic conditions, and in such the spleen is also greatly enlarged, giving both clinical and haematological resemblance to leukaemia. Once again the marrow examination is the clue, but on account of the sclerotic nature of the marrow the sample itself is not easy to obtain without a trephine; this fact in itself is highly suggestive of the diagnosis.

MEDICINE IN THE DOMINIONS

SOME IMPRESSIONS OF A TRAVELLING PROFESSOR

Professor D. M. Dunlop, of Edinburgh, visited Australia, New Zealand, and Singapore as the Sims Commonwealth Travelling Professor for 1951. He has summarized his impressions in a report to the Royal College of Physicians, and we record here briefly some of the points he has made.

Australia

What struck Professor Dunlop in Australia was the excellence of the general practitioners, "probably the best men of their kind in the world." He was impressed by the type of men he met—their self-reliance, wide reading, skill, and enthusiasm. "In remote districts they were indeed doing men's jobs and made me feel very humble." Analysing the causes of this excellence, Professor Dunlop notes that the Australian medical student is drawn from the best type in the country. In Australia medicine is *the* profession to adopt. The young graduate holds his house appointment for at most three months, but it is customary for him to have many such short appointments before beginning practice. This is very good for the future general practitioner, though the short period of his appointment to each charge is less salutary for the hospital patients or for his temporary unit. In Australia, when a man goes into practice he often has to work miles away from specialists, and accordingly has to acquire self-reliance and skill. Professor Dunlop praises the high standard maintained by Australian universities in

the education of medical students in spite of the fact that in most Australian States the university has to accept all applicants for admission to the medical faculty who have attained the necessary standard for admission by passing the matriculation examination, which results in considerable overcrowding. Though the State insists on this compulsory admission it does little, particularly in Brisbane and Sydney, to supply adequate university grants. Thus the teaching staff is small and underpaid, and their preoccupation with routine administration and teaching militates against the carrying out of research. In Sydney, with its enormous hospitals, there is only one small clinical research unit, "an embryo cardiological research unit," and an active paediatric research department. He considers that their funds are insufficient to pay adequate professional and technical staff, and believes that only in the Melbourne Medical School is there a truly academic atmosphere. Professor Dunlop thinks it unfortunate that the excellent research institutions of the Royal Melbourne Hospital, the Alfred Hospital, and the Children's Hospital are outside the university, and are entirely financed from private benefactions and public funds.

New Zealand

Professor Dunlop considers that in New Zealand the advancement of teaching and research is handicapped by the system of hospital management. Districts which supply patients and finance the hospitals elect members of the respective boards—elections conducted largely on a political basis. In Professor Dunlop's view few of the members of these boards have any expert knowledge of hospital management or medical affairs, and the university and hospital staff are not represented as such. The only liaison between the hospital staff and the management board is the medical superintendent of the hospital, who thus occupies an unenviable position. He considers that in New Zealand there is a great need for the presence on hospital boards of management of those representing the profession and the university. Finding the standard of general practice in New Zealand good, Professor Dunlop nevertheless criticizes the method by which the practitioner is paid a standard fee for each consultation. Such a system obviously imposes grave temptations which professional integrity has not always successfully resisted. Nevertheless, the pressure of professional and public opinion has greatly improved this state of affairs during the past two years. The system is popular with both public and doctors and for political reasons is unlikely to be discontinued. "It is not surprising, under the circumstances," Professor Dunlop adds, "that the consumption of medicine per head of the population is even greater in New Zealand than it is here." In his view general practitioners in New Zealand are on the whole over-remunerated, while specialists and whole-time university workers are underpaid, the direct opposite to what occurs in the United Kingdom. A consequence of this is that difficulty is sometimes experienced in filling academic and specialist posts with suitable persons.

Singapore

Professor Dunlop found the clinical and teaching standards at the hospital in Singapore high, and he had the opportunity of lecturing there to large audiences of Chinese, Malay, Indian, and European doctors. He thinks it a pity that more young British graduates cannot benefit from the experience they would derive from the enormous amount of clinical material in the Singapore hospital, especially as the present staff is too small to cope with it: for example, three surgeons do all the major surgery for a population of one million.

In General

Most of the honorary staff of hospitals in Australia and New Zealand are busily engaged in practice, and this cuts down the time they spend in the wards. Assistant physicians work in the out-patient departments and usually have little part in ward work. Also there are fewer full-time registrars than in Britain; one consequence of this is that overmuch responsibility devolves on newly qualified housemen, who are often overworked. As it takes a long time to elicit a proper history from a patient and to perform a meticulous physical examination, but only a short time to send a specimen to the clinical pathologist or to fill up a form for an *x*-ray examination, it was common to find that a rather mechanistic approach to clinical medicine prevailed in many hospitals. In Professor Dunlop's view more full-time registrar appointments are needed in Australasia. Wherever he went in Australia and New Zealand he found young graduates eager to do postgraduate work in Britain. He hopes that when they come here they should not be disappointed in their welcome and in the facilities offered them for work.

SICKNESS IN WINTER

EXPERIENCE OF E.B.S.

Calls on the Emergency Bed Service for London are unusually few at present. There is the normal lull just before Christmas, but apart from that the incidence of sickness is lower than is expected in the offices of the E.B.S.

Regularly every December 15 marks the beginning of a decline in the number of calls doctors put through to the E.B.S. asking for their patients to be admitted to hospital. The decline continues until Boxing Day, and then equally regularly December 27 marks the beginning of a sharp rise. The daily number of calls increases steeply into early January. It usually declines towards the end of January, to rise again in the first half of February. Another decline follows and then there is a rise in March, often to the highest peak in the year. Thereafter the number of calls declines fairly steadily to summer levels.

These three peaks are fairly well marked, but the precise causes of them have not yet been elucidated. They are largely due to requests for admission of cases with respiratory diseases, especially pneumonia. But what has not yet been ascertained is why there should be three successive peaks in each of the first three calendar months of the year.

Success and Failure

During the summer the E.B.S. receives about 700–800 requests a week to get patients admitted. Last January the peak was about 1,800 and the January before about 1,350. The E.B.S. normally expects to get admitted at least 90% of these patients. The remaining 10% comprise hardly any failures, but are chiefly cases for which doctors withdrew their requests. At the worst period last January the E.B.S. was failing to obtain admission for about 40% of the cases. The margin of failure was in fact much smaller than might be suggested by that figure, for it represents about 100 cases a day, and the E.B.S. is in constant touch with about 200 hospitals. Requests from doctors are now reaching the E.B.S. at the rate of about 1,000 a week, and over 90% of these cases are being admitted to hospital. This information is published weekly in our "Medical News" columns.

Warning System

The E.B.S. has introduced a system of warning hospitals about the volume of requests for admission. When the percentage of cases admitted falls to 82½% the E.B.S. will send out a "white" warning, when 80% a "yellow" warning, and when 75% a "red" warning. The white warning is simply to put hospitals on their guard. On receiving a yellow warning hospitals are asked to prohibit the closing of wards for cleaning, etc., to reduce admissions for "cold" surgery and for investigation, and temporarily to increase the bed complement. Hospitals will intensify these measures when they receive a red warning. The system has had an experimental run, but the occasion for operating it in earnest has not yet come.

PRINCESS ELIZABETH AT THE ROYAL COLLEGE OF SURGEONS

On December 5, as noted briefly in last week's *Journal* (p. 1472), Princess Elizabeth was admitted an Honorary Fellow of the Royal College of Surgeons of England.

Princess Elizabeth was received at the College by the President, Sir Cecil Wakeley, and by the Vice-Presidents, Mr. P. H. Mitchiner and Sir James Paterson Ross. In welcoming the Princess the President declared that it had for many generations been the treasured privilege of the College to receive the patronage of the Royal Family in

Photo by Philip Gotlop, London

their efforts for the benefit of mankind. Within the last decade they had been deeply honoured by the presence there of the King, the Visitor of the College, and the Queen, who is an Honorary Fellow. The coming of Princess Elizabeth had a very special significance. They ventured to regard her as the very personification of hope and trust in the future. At that time their thoughts were focused on the future, for within the next few weeks the erection of the new College buildings would begin. What omen could be more propitious than the appearance of a Royal Lady in their midst?

Pledges to the Future

In presenting Princess Elizabeth to the President for admission as an Honorary Fellow, Mr. Mitchiner, after testifying to the well-earned popularity and love in which she was held throughout the British Empire and Dominions, recalled how some years before when passing that part of Hyde Park, now democratically derailed, but then the private pleasance of those privileged to live in 145, Piccadilly and the neighbouring houses, he had found, rolling across the pavement towards his feet, a ball. When he returned it to the anxious-eyed little girl peering through the railings who had said, "Thank you," so nicely, he had little thought that he was placing the orb in the hands of England's future Queen. Princess Elizabeth was now herself the mother of two sturdy children: Prince Charles had a will of his own, an inquiring mind, and a clear, blue eye capable of an unwinking stare—those augured well for the future of the country under the rule of Charles III. Princess Anne he had seen only asleep in her perambulator, but, judging by the tendency displayed in many of her photographs to push her parents and relations from her, she would doubtless develop a fine independence of character coupled with a forthrightness of speech such as had endeared her great-grandmother, their beloved Queen Mary, to several generations of the British people.

The Princess's Reply

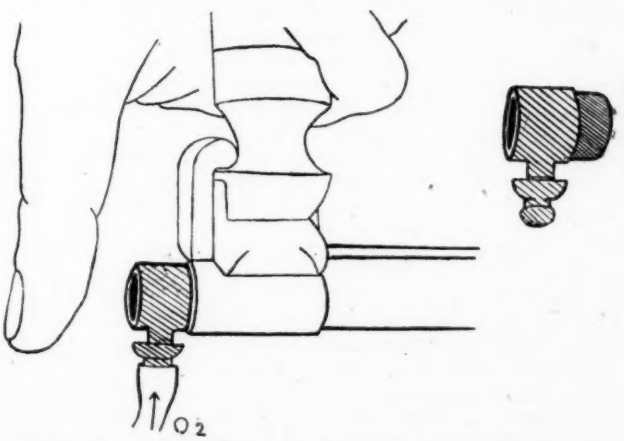
Princess Elizabeth replied that she was most grateful to the President for admitting her as an Honorary Fellow of the Royal College of Surgeons of England, and to the Vice-Presidents, her sponsors. She was proud to be associated, as were her father and her mother, with this College which was doing so much to further the science and art of surgery, not only in this country but throughout the whole Commonwealth. She was especially glad to know that plans for the future included a residential college where 80 post-graduate students, many of whom would come from other parts of the British Commonwealth, might live and work.

The astonishing development of surgery during the 151 years since the College had received its first Royal Charter, and the seeming miracles surgery performed to-day, were things in which laymen and experts alike might all rejoice. Her own family, like so many others, had the best reason in the world to be glad of it. There was, moreover, another aspect of that development which should give them all happiness. Nowadays on every side they heard much spoken of the evils of the present age and of the destructive uses to which man had put his new-found scientific knowledge. They did not hear nearly enough of the good which was also being done. Surgery at least was one field in which man's wisdom and energies had been devoted consistently to human good; there the new discoveries of science had been bent wholly on saving life and not on destroying it, on relieving suffering and on healing. That surely was a thought full of hope and promise, not only for the sick but for all who believed in human progress.

Preparations and Appliances

INFLATION OF THE LUNGS DURING BRONCHOSCOPY

Dr. R. BRYCE-SMITH, first assistant, Nuffield Department of Anaesthetics, University of Oxford, writes: When bronchoscopy is performed on an unconscious patient, either as an emergency or for diagnostic purposes, it may become desirable to inflate the lungs intermittently to avoid anoxia. In attempting this, difficulty is often experienced in achieving a gas-tight connexion between the ends of most broncho-



scopes and the source of oxygen. This difficulty has been overcome by designing a small adaptor for use with the Longworth bronchoscope.

The metal adaptor illustrated is 2 cm. in length. When inflation is required oxygen is run into the side inlet, which is waisted to take rubber tubing of any bore. One end of the adaptor is tapered to plug into the bronchoscope and the other is covered with a finger when inflation is required. The view down the bronchoscope is not impaired by the

adaptor, so that it can be left in position throughout bronchoscopy, whether the patient is breathing normally or not.

The adaptor is made by the Longworth Scientific Instrument Company, Thames Street, Abingdon, Oxfordshire, to fit their bronchoscope, the lumen of which is large enough to take a Thompson blocker when this is indicated in thoracic surgery. As the instrument operates from a standard laryngoscope handle containing a battery, it is of value in an emergency.

Nova et Vetera

ST. LUKE'S HOSPITAL

The Story of St. Luke's Hospital. 1750–1948. By Brigadier C. N. French, C.M.G., C.B.E. With foreword by Sir George Cockerill, C.B. (Pp. 212. 8s. 6d.) London: Heinemann Medical Books. 1951.

Members of a modern civilized community may justifiably pride themselves on the great scientific progress which allows of so many comforting amenities, but the perusal of the story of St. Luke's Hospital will certainly help to subdue that pride. St. Luke's Hospital, named after the parish in Finsbury in which it was situated, was founded in 1751. Charles Dickens, who visited the hospital in 1852, thus described its origin:

"On the 13th day of January 1750, when the corn which grew near Moorfields was ground on the top of Windmill Hill, 'Fensbury'; when Bethlehem was a 'dry walk' for loiterers, and a show; when lunatics were chained, naked, in rows of cages that flanked a promenade, and were wondered and jeered at through iron bars by London loungers, half a dozen gentlemen met together to found a new Asylum for the Insane."

The six men referred to were Dr. Crowe, a physician; Mr. Speed, a druggist; Mr. Prowting, an apothecary; Mr. Sperling and Mr. Light, merchants; and Mr. Francis Magnus. They met at the Kings Arms tavern in Exchange Alley, and decided to appeal for funds to found a new hospital for lunatics, inasmuch as the hospital of Bethlem "is incapable of receiving and maintaining the great number of melancholy objects of this sort who apply for relief."

The hospital was first housed in a building called the Foundry, situated in Windmill Hill, Upper Moorfields (now Tabernacle Street). The Foundry, once used for casting cannon, had later been used by John Wesley as a place for preaching. The hospital was meant to receive those for whom there was a good prospect of recovery, and was to be free of charge except for those who came in again or became chronic. The number of patients was at first 24, but within a year reached 57. Within 10 years 749 patients had been admitted and 363 discharged cured.

In 1786 the hospital moved to new, specially built and rather imposing premises in Old Street. The new building was rather cheerless and contained only one bath, and that a cold one into which patients were put if they proved too refractory. Improvements were, however, gradually made, particularly under pressure from the Commissioners in Lunacy, who began to inspect the hospital in 1842. There were frequent differences of opinion between the medical and lay administrators, and only gradually did the medical men get proper control. The hospital continued to do good work in the Old Street building until 1917, when the property was sold with a view to building a new hospital farther out from the city. In the course of its long history St. Luke's admitted 25,569 patients, of whom 11,077 were discharged cured. The governors also owned properties at Nethercoat, in Kent, at Welders, in Buckinghamshire, and they had a private nursing department in Nottingham Place.

In 1923, by agreement between the governors of the Middlesex Hospital and the committee of St. Luke's, a joint psychiatric clinic was started in association with the Middlesex Hospital, and two small wards were reserved at that hospital for in-patients. In 1930 a new hospital was built at Woodside, Muswell Hill, for "educated people of slender means who, while shrinking from entry into a public institution, cannot afford the necessarily high charges for private individual treatment."

Under the National Health Service in 1948 St. Luke's Foundation became one of the group of hospitals of which the Middlesex Hospital was the teaching-hospital centre, and the hospital is now known as the St. Luke's Woodside Branch of the Middlesex Hospital. The hospital is an essential part of the department of psychological medicine of the Middlesex Hospital.

There is no doubt that St. Luke's Hospital did pioneer work in the treatment of the insane, but in its early days there was considerable room for improvement. When Charles Dickens visited the hospital he was shown two chairs which had formerly been used to limit the movements of refractory patients.

"As high as the seat are boxes to enclose the legs, which used to be shut in with spring bolts. The thighs were locked down by a strong cross board, which also served as a table. The backing of this cramping prison is so constructed that the victim could only use his arm and hands in a forward direction, not backwards or sideways."

Nevertheless, in 1830 Charles Lamb, who was a governor of the hospital, wrote:

"I was over St. Luke's the other day with my friend Tuthill and mightily pleased with one of his contrivances for the comfort and amelioration of the students [*sic*]. They have double cells in which a pair may lie feet to feet horizontally, and chat the time away as rationally as they can. It must certainly be more sociable for them these warm raving nights."

Mrs. Elizabeth Fry, who visited the hospital in 1831, also wrote in its praise, and Charles Dickens, while criticizing the treatment of past times, spoke very well of the conduct of the place at the time of his visit.

The hospital was served very faithfully and for long periods by many of its officers, but on many occasions length of service appeared to engender a very conservative attitude of mind.

V. ZACHARY COPE.

Reports of Societies

THE PLACE OF CLINICAL PATHOLOGY

"The Place of Clinical Pathology in Changing Medicine" was the subject of a discussion at the Medical Society of London on November 26. Mr. A. C. PALMER, President, was in the chair.

Dr. CUTHBERT DUKES, in a retrospective review, traced three phases in the development of clinical pathology. When hospitals first began to recognize the need for a pathological department it was common for a physician with a liking for microscopy or chemistry to be asked to "look after the pathology." The second phase came about when the post of pathologist was regarded as a stepping-stone to the honorary staff. The third phase was reached some 20 or 30 years ago as the result of the extension of scientific medicine, when the clinical pathologist emerged, to receive at first a cold welcome from his pathological variants, the pure bacteriologist or the pure biochemist, but eventually to prove himself a useful person so that the adjective "clinical" as applied to a pathologist was no longer a term of abuse.

During the last 25 years the most important change had been the very wide extension in the scope of clinical pathology and the enormous increase in the number and variety of laboratory tests a clinical pathologist was expected to undertake. The next most important change was the improvement in the training and qualifications of laboratory assistants, or technicians as they were now called. The status and training of the clinical pathologist himself had also altered. It was now recognized that at least five years' post-graduate training was needed for a specialist in clinical

pathology, and that this training should include experience in bacteriology, biochemistry, serology, and haematology, as well as general pathology. The last change concerned the functions of the clinical pathologist. The mastery of the technique of the laboratory would in the future not be sufficient qualification in itself. The clinical pathologist would henceforth have to maintain a closer contact with clinical medicine if he was to succeed in acting as the connecting link between the bench and the bedside.

The Place for Pathology is the Ward

Professor R. J. V. PULVERTAFT began by quoting from an obituary notice of Colonel Charles Donovan in the *British Medical Journal* (November 24, p. 1286): "His remarkable bedside clinical teachings were based on physiological principles. He spent hours on microscope work and stimulated his students to do likewise. . . ." No words of his could more lucidly express the difference between the pioneer work of the old type of clinical pathologist and the work of many of the men in present-day laboratories, with whom it was more generally a question of "Whodunnit." When he himself was a student at St. Thomas's a certain amount of the post-mortem work was carried out every week by physicians, and nothing was more inspiring than to see a senior physician demonstrate the lesions which he had first diagnosed at the bedside. To-day as a rule the physicians and surgeons did not carry out post-mortem examinations. How often, again, did the radiologist visit the post-mortem room? Originally the radiologist compared the lesion with the shadow, but for a good many years past he had been comparing shadow with shadow. Laboratory work must be brought back to the ward. The place of the laboratory in changing medicine, which was the subject of the discussion that evening, should include first of all the geographical place. The modern hospital was more than a collection of beds, and the clinical laboratory should be in the very middle of it.

Professor Pulvertaft also considered that in modern medicine, to its most grievous loss, they were wasting the ingenuity, inventiveness, and ideas of the general practitioner. "It is idiotic to suppose that all the inventiveness, the intuition, and the bright ideas come from the relatively small group of consultants in medicine and surgery and other specialists; but at present those bright ideas have no outlet, and I think they will have to wait—it may be for a long time—for health centres to be built. At the present moment, certainly in provincial hospitals, we are not equipped or staffed or housed to cope with this problem."

Neglect of Clinical Medicine

Dr. A. H. DOWTHWAITE said that the tendency for the physician and surgeon to move away from the post-mortem room was very much to their loss and the loss of their students. He also said that it was for the clinician to see to it that his students and house officers were not too much swayed by the apparently easy methods of the laboratory—the report coming back with the answer pat—so that they neglected clinical medicine. There was another aspect of the matter. Certain radiologists and pathologists—not men of the highest calibre—enshrined in the fortress of their laboratories, tended in time to think that they themselves could make the diagnosis. With the rapidly expanding pathological service it was obvious that there was not a sufficient number of first-class men to meet the full demand, but there was a temptation on the part of some young clinicians to imagine that because a report came from the laboratory it must be from a first-class man.

The Discussion

Sir HORACE EVANS thought that an undue emphasis on morbid anatomy was a great snare for the student. He hoped the discussion of that evening would result in sending the clinical pathologist oftener to the wards and the clinician himself to the laboratory.

Mr. E. W. RICHES said that in this matter of contact between the pathologist and the wards some of the smaller hospitals had an advantage. In one such hospital in which he worked the pathological department, instead of being in some remote corner, was on the same floor as the theatre, so that one had to pass it on the way out, and he rarely passed it without going in and talking to the pathologist and looking at his slides.

Mr. GUY BLACKBURN suggested that the best way of solving the problem might be to institute clinico-pathological conferences for students—an arrangement very popular in the United States.

Dr. R. W. COCKSHUT said that when he thought of the ever-increasing ramifications of specialism he went back to his general practice with a new happiness in belonging to that great branch of medicine (general practice) with its obvious satisfactions.

Dr. A. L. WINGFIELD divided clinical pathology work into two classes, the one concerned with the type of case in which the clinician looked for laboratory confirmation, and the other in which the clinician was bedevilled and in which the clinical pathologist might be asked to come over and see the patient with him.

Dr. CUTHBERT DUKES said that he hoped a time would come when the facilities of the clinical pathology department would be open to the general practitioner, that contact between the clinical pathologist and the general practitioner would be made, and that the latter would come to learn that very good tea and coffee were available in the laboratory in the afternoon.

E.N.T. IN GENERAL PRACTICE

On December 7, at the Royal Society of Medicine, the Section of Laryngology, with Mr. F. C. W. CAPPS in the chair, had as their guests the Section of General Practice to discuss "The Role of the General Practitioner in Oto-rhino-laryngology." The openers were two specialists in ear, nose, and throat work and three general practitioners, two of whom have a special interest in laryngology.

Mr. MYLES FORMBY, stressing the importance of collaboration between the general practitioner and consultant, instanced several conditions, such as focal sepsis associated with high blood pressure and allergic and psychiatric states, in which the general practitioner's knowledge of the patient was of immense importance in assessing the nature of the nose or throat complaints. In the extended use of antibiotics Mr. Formby saw a swing from surgical to medical treatment of many oto-rhino-laryngological conditions, but warned of the dangers of not being aware of complications—for instance, that permanent deafness might result from not letting the sterilized pus out of the middle ear.

Undergraduate and Postgraduate Training

Miss JOSEPHINE COLLIER thought that the training of medical students in oto-rhino-laryngology should be directed towards teaching the handling of instruments that could be used in general practice. A headlamp, for instance, might be more serviceable than the head mirror with reflected light. Chemotherapy and the use of antibiotics had altered the tempo of acute E.N.T. infections without diminishing their importance, and treatment should be combined with accurate observation. An E.N.T. house appointment should be useful to the future general practitioner, and she hoped that such an appointment would be recognized for the pre-registration posts when those were compulsory. (Other speakers agreed with this view, and two doctors reported independent calculations that between 40% and 50% of their patients required examination of the upper air passages.) Miss Collier thought that with such

experience many cases could be treated in the surgery which at present come to hospital. In that way the clinical activities of the general practitioner would be extended.

Revising the Tonsil Waiting-list

Dr. J. P. KIES had recently gone over a large tonsil waiting-list, some of the children on which had been waiting for two or three years for operation. On re-examining the children he had found that about 30% had no clinical indication for tonsillectomy, 30% required operation, and in the remaining cases operation would not be justified until after further investigations. (Similar figures were given later in the meeting by a consultant.) Dr. Kies considered that too much attention was paid to the indications *for* tonsillectomy and not enough to those *against* it. Among the latter he mentioned persistent colds, enlargement of tonsils, allergy, and fussy parents.

Dr. H. A. WARE described a group practice in an agricultural region of England, in which he was also responsible for the oto-rhino-laryngology at the hospitals. He agreed with all the previous speakers that students were not given enough instruction in that branch of medicine. The whole-time general practitioner, he said, lacked the time, the equipment, and often the knowledge to examine the ear, nose, and throat properly. Dr. I. PIRRIE, in the discussion later, agreed that the "young locums" who came his way were most ignorant of "skins and ears," and Mr. V. E. NEGUS was inclined to lay blame for this on the belief that the whole subject was "specialty." In fact, like diseases of the chest, it was a subject both of general importance (for the general practitioner to deal with) and for specialist opinion. He added that some of the blame must rest with the examining boards, which hardly ever set oto-rhino-laryngology questions or had laryngologists among the examiners.

Cauliflower Ears

Dr. J. D. SIMPSON thought that the general practitioner's value lay in diagnosis and the simplest treatment. He referred to some common problems of practice: When should tonsils be removed? When should a drum be pierced? What was the association between sinusitis and pulmonary base collapse? He fancied that the family doctor was often more anxious for tonsils to be removed than the consultant was. He had a word to say, and some pictures to show, concerning cauliflower ears, a more or less occupational disease among the undergraduates of the university town in which he worked. And here he rather shook the assembly by advocating incision, drainage, and the application of a cunning little splint devised by his colleague, Dr. E. Killey.

The Unanswered Questions

In the discussion a number of speakers elaborated points already made. The chairman asked practitioners to report more of the consultants' failures. He had a feeling that post-tonsillectomy haemorrhage, for instance, was commoner than some supposed. Dr. O. PLOWRIGHT and Dr. G. F. ABERCROMBIE both remarked that it was all very well for the specialists to say that routine antibiotic administration might be harmful, but no one had told them which sort of case ought to be given penicillin and when a myringotomy should be done. As on previous occasions when joint meetings have been held between the general practitioners and specialists of one sort or another, your reviewer found that important questions of this sort cropped up towards the end—questions that might very well have been anticipated by the openers—and went unanswered.

Professor C. Singer, the medical historian, has presented a book and a letter of Francis Adams to the University of Aberdeen. Adams was a graduate of Aberdeen, and as well as being a doctor was a noted classical scholar; the book is his own copy of *De Consolatione Philosophiae*, and together with the letter will be displayed in the library of the medical school (*Scotsman*, December 12).

Correspondence

Deafness from Dihydrostreptomycin

SIR,—Dr. R. N. Johnston (December 1, p. 1345) is probably right when he states that "an explanation may be found in the dosage and mode of administration of this drug." With a small series of about 100 cases of pulmonary tuberculosis (mostly of the exudative and disseminated type) treated with this drug in combination with P.A.S., I have had no cases of deafness, nor any other serious neurotropic manifestations. But I have never exceeded a dose of 1 g. a day, and in one or two cases of adolescents weighing less than 90 lb. (40 kg.) the dose has been slightly reduced. Clinically and radiologically the results have been excellent in a majority of the cases—and dramatic in a few. Resistant strains have appeared in about 5% of the cases only. I have no experience of the treatment of meningitis. But I have often wondered if the larger doses of 2 g. or more are always necessary. Again, some clinicians regulate the dose by the age of the patient. Would it not be safer to do so by the weight of the patient?—I am, etc.,

Kingussie. FELIX SAVY.

SIR,—At a clinical meeting of the South-western Laryngological Association, which was held in the Queen Elizabeth Hospital in Birmingham on October 13, a patient was shown who had been treated by dihydrostreptomycin with subsequent hearing loss in his normal ear, but improvement in hearing in his chronically discharging ear. As this case result raises questions of general interest on the mode of action of dihydrostreptomycin, and indicates the possibility of successful therapy in preventing dihydrostreptomycin deafness, a brief summary is presented: the record in greater detail will be submitted to the Editor of the *Journal of Laryngology and Otology* for publication with the proceedings of the meeting in due course.

The patient was a man aged 26, who was admitted under the care of my colleague Professor P. C. Cloake, suffering from tuberculous meningitis, in July, 1950, and he was referred to me for aural assessment on July 21, as he had had a discharging right ear, painless at the onset, for six years previously. He had a right chronic suppurative otitis media with foul exudate in the meatus and middle ear, loss of drum head, and injected granulations in the middle ear. Hearing tests showed him able to hear my forced whispered voice at this ear. His left ear was normal and he heard my whisper at 20 ft. distance from it.

During the following four and a half months he received 208 g. dihydrostreptomycin intramuscularly—2 g. a day, with three periods of rest from treatment—and made a good clinical recovery from his meningeal symptoms. His aural progress notes record that his left ear remained symptom-free and retained its high level of hearing until November, 1950, when there was a rapid loss of hearing in the course of a few days. This hearing loss persisted, and when tested in April, 1951, he was only able to hear a whisper at this ear. In October, 1951, whisper (Wp.V.) distance on this side had improved to 6 in.

In his right ear discharge ceased in August and hearing improved to Wp.v. at 3 in. Discharge recurred after three weeks and persisted, with acid-fast bacilli in the discharge. In April, 1951, Wp.v. was 6 in., and by October 10 it was 5 ft., with granulations still present.

The progressive improvement in hearing in the discharging ear after dihydrostreptomycin therapy, and the presence of a brisk fistula symptom in this ear, show that the right labyrinth has been insulated from the toxic effects of dihydrostreptomycin which severely affected the normal ear, and suggests that an inner ear hyperaemia associated with the inflammatory middle ear lesion has protected the vestibular and cochlear end organs from injury.

One of the unexplained features of dihydrostreptomycin deafness is its occasional late onset some three months or more after the end of treatment. From the most recent pathological evidence the streptomycin lesion—according to A. Glorig (*Ann. Otol., etc., St. Louis*, 1951, **60**, 327) has now been located in the end organ, and the protection given to the end organ in this case by a local hyperaemia, taken

in conjunction with the late onset of deafness in some cases after dihydrostreptomycin, suggests that the lesion may be one of vascular occlusion of labyrinthine vessels, and not due to toxaemia of the epithelial cells. Perhaps a review of the pathological material with this possibility in view will provide the evidence.—I am, etc.,

Birmingham. W. STIRK ADAMS.

SIR,—The recent correspondence in the *Journal* concerning the effects of dihydrostreptomycin on the eighth nerve is of great interest and importance. The conclusions reached by Drs. I. A. B. Cathie and D. H. Garrow (September 22, p. 735) that dihydrostreptomycin is not only a potent neurotoxin to the eighth nerve, but that its actual efficacy in the treatment of tuberculous meningitis is inferior to the other forms of streptomycin, seems to be borne out by our experience with this drug.

Since September. 1948, when streptomycin first became available here, 57 cases of tuberculous meningitis have been treated at this hospital. Of these, 28 have been given the calcium chloride complex, and when dihydrostreptomycin was introduced in 1950 the next 29 consecutive cases of tuberculous meningitis were treated with it. Of the 28 cases treated with the calcium chloride complex, 16 survived, and of these three have been found to be deaf. Of the 29 dihydrostreptomycin-treated cases, only 11 survived, and of these seven are completely deaf.

This increase in mortality rate occurred at a time when considerable experience had already been gained in the treatment of tuberculous meningitis and in spite of the introduction of *para*-aminosalicylic acid and purified protein derivative. A review of these two groups of cases indicates that the only material difference in treatment was the substitution of the dihydrostreptomycin for the calcium chloride complex. While the figures may not be of statistical value, they suggest that the dihydrostreptomycin is responsible for the poor results and the increase in the deaf survivors.

We were fortunate in obtaining the assistance of Mr. P. Gaskill, of the Department of Education of the Deaf, at the University of Manchester, who performed the hearing tests for us using the audiometric pure tone speech tests and the Ewing tests for children at various stages in the course of the meningitis, and he has noted that the earliest form of hearing loss is a high tone deafness which eventually becomes complete. The apparent suddenness of the onset of deafness (presumably to speech) as noted by Dr. J. Grant (November 17, p. 1221) may in fact have been the invasion of the deafness into the frequencies normally occupied by speech.

As a result of our investigations we too have abandoned dihydrostreptomycin in favour of the calcium chloride complex by the intramuscular and intrathecal routes.

While survival of a case of tuberculous meningitis following treatment is gratifying, it is a tragedy for the child to re-enter society partially or completely deaf, particularly when intelligence may not be impaired, and it is to be hoped that a clearer understanding of the pathology of the eighth nerve deafness following streptomycin therapy will assist us in the prevention of this disastrous handicap.—I am, etc.,

Manchester. N. SHER.

Secrecy of Psychiatric Case Records

SIR,—While the letter of the Chairman of the Association of Medical Records Officers (December 1, p. 1339) is reassuring evidence that steps are taken in hospitals to make certain that the clerical staff realize what trust is put in them, can we be given a similar reassurance by someone representing the clerical staffs of executive councils? Is a duty specifically imposed on all who handle N.H.S. record envelopes not to divulge any information contained in them—or even on them, for the back of the envelope is itself used for clinical notes?

If a psychiatrist is to help the referring general practitioner to understand the patient's difficulties, the psychiatric report must sometimes contain details of the patient's personal habits, ideas, or relations with his family. On receiving such a report (probably marked "Confidential"), the general practitioner may fear to enclose it in the N.H.S. record envelope because to do so might seem to him a breach of confidence. Yet not to insert the report may be even more injurious to the patient, who on transfer to another doctor may consequently be tackled from the wrong angle, submitted to a further series of investigations for possible organic disease, or wastefully referred again for psychiatric advice.

The problem of whether N.H.S. record envelopes are to be regarded as confidential documents is of particular importance in respect of psychiatric reports, but it also concerns the general practitioner's own entries relating to clinical findings such as venereal disease.

What is the legal position? Can a general practitioner be held to have libelled a patient or a patient's relations by making a note or inserting a report seeming to reflect on their private habits? Are these record envelopes confidential documents, and if so should the word "Confidential" appear prominently on each? Is every possible step already being taken to guarantee their security as they pass through the various executive council offices, some of which might perhaps not be so reliable as I believe our own to be?—I am, etc.,

Boscombe, Hants. I. HOWARD JENKINS.

Flying Accidents

SIR,—I do not wish to take up more of your space in trying to substantiate my own theories (September 22, p. 707) with regard to the injuries sustained by victims of the Viking air crash. More information has been asked for, however, and more has come my way.

It was eventually possible to place the seating arrangement of three of the victims of the Viking aircraft at the time of the crash on evidence obtained from the two survivors. On this evidence, two of the victims were known to have aft-facing seats—and both died from fracture of the skull. One victim was known to have occupied a forward-facing seat and died from rupture of the aorta.

Dr. P. S. Rutherford's suggestion (December 1, p. 1337) that the rupture of the aorta is due to a sudden swaying down of the abdominal viscera is not supported by the facts that in four cases the ruptures were associated with fractures of the spine (at the same level) and that the ruptures occurred at varying levels but as low as the 12th thoracic and 2nd lumbar vertebrae.

Dr. A. Buchanan Barbour (October 6, p. 854) is correct in saying that the survivors of both Dakota and Viking aircraft could have been sitting in forward-facing seats and wearing lapstraps. They were also at the rear of the respective planes where the chances of survival—quite apart from the cause of death—are known to be greatest in such crashes. This is due partly to the buffer action of the disintegrating forward part of the plane, an effect which is more simply seen in railway accidents, where carriages and their occupants distant from the point of impact suffer the least damage. This effect was seen in the Llandow crash, when all but the rear seats tore away from the floor and folded up like a concertina in the front of the plane. Two of the three survivors were found in the rear seats, which had not been dislodged, and were securely held and saved by their lapstraps. I cannot deny that possibly the arm rests were responsible for some of the injuries that I found, but ruptures of the anterior surface of the liver and tearing of both renal pedicles indicated to me that violence had occurred over the middle of the abdomen and not to one side or the other.

For the information of Dr. Barbour and Dr. K. G. Bergin (October 13, p. 909) the fractures of the skull were distributed as follows: seven were situated in the frontal regions—including the pilot and co-pilot; two involved the middle fossae, and one was in the occipital region. The two passengers whose seating was known to be aft-facing died from occipital fracture in one case and middle fossa fracture in the other.

Meanwhile, I continue to use a lapstrap on the rare occasions on which I fly—but I also choose a seat, when possible, "back to the engine."—I am, etc.,

London, W.1. DONALD TEARE.

Bornholm Disease in Malaya

SIR,—With reference to the preliminary report by Drs. J. B. M. Davies and J. F. Warin on an epidemic of Bornholm disease in Oxford (October 20, p. 948) the following case will be of interest.

On November 3 a male Malay student, aged 18, was admitted to the General Hospital, Seremban, Negri Sembilan, Malaya,

complaining of fever, sore throat, severe headache, and some photophobia for the previous two days. Examination revealed nothing of interest except a slightly inflamed pharynx and a leucocytosis of 13,750 per c.mm. The headache and fever continued unabated for three days and on November 6 a lumbar puncture was performed. The cerebrospinal fluid was under pressure and 20 ml. was drawn off. The cell count was normal but the sugar content was rather low, 0.56%. The headache disappeared the following day.

On November 10 the patient complained of a severe pleuritic pain in the chest below the right nipple and the chest was strapped the following day. The pain gradually subsided and he was discharged quite well on November 20.

I was aware that he had been staying with an Englishman who had been flown out from England, arriving in Malaya on September 27, and on making inquiries it was discovered that this man had visited Oxford and had a meal there in a hotel on September 23. The patient came to stay with him on October 2 when he returned to Malaya.

There have been no other cases of Bornholm disease reported locally, and as there is a similarity between this case and the Oxford ones it would seem that the Englishman might have acted as a carrier.—I am, etc.,

Seremban, Malaya. J. E. MCMAHON.

Indian Remedies for Poor Memory

SIR,—I am shocked to think that so reputable a publication as the *British Medical Journal* should countenance the publication in its correspondence columns of the letter entitled "Indian Remedies for Poor Memory" by Dr. Sohrab A. E. Hakim (October 6, p. 852).

It is true that *Catha edulis* is a stimulant narcotic and when taken in small quantities produces a sense of mental alertness which in turn might have the effect of stimulating the memory processes. The fact is, however, that it is a most dangerous drug of addiction which in countries such as South-west Arabia, Somaliland, Abyssinia, and part of East Africa is known to have deleterious effects on the health and social conditions of those who indulge in it. It is in my view most undesirable that your readers should be left with the impression that *Catha edulis* is a simple, effective, and harmless remedy for impairment of the memory. For a more detailed study of the drug and its effects I refer you to the following:

"Khat" (Greenway, P. J., *E. Afr. agric. J.*, 1947, **13**, No. 2).

"Poisoning by Khat or Miraa, *Catha edulis*" (*E. Afr. med. J.*, 1945, **22**, 1).

"*Catha edulis*" (Bally, P. R. O., *E. Afr. med. J.*, 1945, **22**, 2).

"The Need for the Control of Khat" (*E. Afr. med. J.*, 1945, **22**, 9).

"A Case of Poisoning by *Catha edulis*" (Heisch, R. B., *E. Afr. med. J.*, 1945, **22**, 7).

—I am, etc.,

Somaliland. D. A. BAIRD, Director, Medical Services.

Phenadoxone Addiction

SIR,—Professor E. J. Wayne's article "The Medical Relief of Pain" (September 29, p. 787) gives a very good summary of the present position. He mentions that phenadoxone ("heptalgin") addiction has not been reported, and the purpose of this letter is to record one case. Originally the patient was suffering from morphine addiction, but some time following his successful weaning from that drug he began to take phenadoxone in large quantities (72 ampoules of 10 mg. daily), as he apparently found it a suitable substitute, but was using it in the belief that it was not habit-forming. Withdrawal was more easy than with morphine, but otherwise the clinical position was similar.—I am, etc.,

Nicosia, Cyprus. J. E. O'N. GILLESPIE.

Fatal Case of Nicotine Poisoning

SIR,—Death from poisoning by nicotine following the taking of insecticides containing a high concentration of the alkaloids has been by no means rare. A case in 1931 is mentioned by Taylor (*Principles and Practice of Medical Jurisprudence*, 1948, 10th ed., London), but most of the recorded cases are of a much earlier date, and none of these reports gives the result of full toxicological analysis of the organs; and it is to provide these details and to emphasize the extreme rapidity with which the poison is absorbed that the following account is given.

A man of 32 was served with a cup of tea in his office, and a few minutes later was heard to be groaning in an apple store near the house. He was unconscious and had vomited: consciousness was not regained and he was dead when the doctor arrived shortly afterwards, although the time which had elapsed between taking the poison and death could not have been more than about 20 minutes.

At the time of the necropsy there was no discoloration around the lips or tongue, and no odour could be detected either from the mouth or from any of the organs. The last inch of the oesophagus showed some haemorrhagic streaks. In the stomach there was a small amount of blood. The mucosa of the stomach was dark red in colour, due to acute irritation, and there were many small haemorrhages of the mucosae of the duodenum and the first part of the ileum. The other organs were healthy. Analysis of the organs (Mr. E. B. Parkes) gave the following amounts of nicotine: stomach contents 2,942.5 mg., intestine 152.3 mg., liver 37.2 mg., kidneys, spleen, and heart 9.7 mg., brain 34.0 mg., vomit 231.5 mg., making the total amount of nicotine recovered 3,175.7 mg. or approximately 48.85 grains. The fatal dose of nicotine is usually considered to be about 1 grain.

A bottle of insecticide found in a locked cupboard of the room contained 98% nicotine, and a small amount of fluid mixed with tea in the cup gave a positive test for the alkaloid.

I wish to thank Mr. Rackwood Cocks, H.M. coroner for the City and County of the City of Exeter, for permission to publish this case, and Mr. E. B. Parkes, director of the South-west Forensic Science Laboratory, who carried out the toxicological analysis.

—I am, etc.,

Exeter. G. STEWART SMITH.

Our Daily Bread

SIR,—Dr. Franklin Bicknell (December 1, p. 1338) raises some very distressing points. Why indeed is our English bread so bad and why so adulterated? Why is it that my patients find such difficulty in buying the good wholemeal loaf that I always advise them to eat? Perhaps some miller or baker could tell us.

But I think that the remedy is in our own hands, for surely it is a matter of educating the public first to appreciate and then to demand a good bread. I think that all the difficulties at present in the way could be overcome in time. My wife and I go to the trouble of buying compost-grown wheat which is ground in our kitchen and made into bread without delay. Nearly all our guests remark on it, often saying that they did not know that such good bread could be obtained in this country. Similar bread can be purchased in a few shops. Excellent wholemeal flour is not difficult to obtain, and bread-making by the Grant method does not take much time.

It may be ethical for the laymen who direct the British Baking Research Association to be "interested in what the consumer prefers and to advocate freedom of choice in this matter" (December 1, p. 1339). But surely this is too low an ethic for us as doctors responsible for public health. I think that in the matter of better bread we can do much both by precept and example.—I am, etc.,

Blackheath, S.E.3. C. V. PINK.

The Doctor and the Courts

SIR,—Dr. G. A. F. Holloway's letter (December 1, p. 1339) is sad reading. I suggest he comes to Scotland.

I also had to attend the court last week, a most unusual occurrence for me, but, unlike Dr. Holloway, I was cited a fortnight beforehand. This, too, is the invariable custom in Midlothian. Arrived at the court, I asked the usher when my case would start (a case of drunk in charge). He told me there were two cases

and that only the Procurator Fiscal would know which would be first. Could I see the Procurator Fiscal and ask that my case be put first? Most certainly I could. He showed me where to go, and where to find Room 55, where I would find a policeman to guide me. Could I see the Procurator Fiscal and ask that my case be put first? Most certainly I could. He took me to the Procurator's office and asked whether he would see me. Certainly. "Oh," he said; "you are Dr. Moir. Well, I am so sorry not to have been able to tell you before you left home, but I have just heard by telephone that your man has decided to plead guilty, and the case is off." Twice he emphasized that it was only within the last ten minutes he had heard that the client would plead guilty, and how sorry he was that I had been troubled. "But you will go and get your fee." I thanked him and said I was delighted to get away so quickly. The waiting policeman took me to the office where the payments are made. A polite young lady asked whether I considered £1 1s. enough, or was my time lost worth more than that? I considered £1 1s. for being about ten minutes in the court house quite enough. Unlike Dr. Holloway, I had only five miles to travel to Edinburgh.

Those are the bare facts, as Dr. Holloway says in his letter. I received nothing but courtesy and help. Even one of the policemen involved in the case, whom I met, thanked me for the trouble I had taken over his "case."—I am, etc.,

Currie, Midlothian. H. MAITLAND MOIR.

Educating the Public about Cancer

SIR,—Both your correspondents Drs. Malcolm Donaldson and Livingstone-Spence (November 24, p. 1279) evade the main criticism in my letter, but have sought to put diverse erroneous constructions on my words; the former suggests that I would advise mastectomy on mere verbal evidence of the patient; the latter that I would sit tight and do nothing though recognizable clinical evidence exists. Both claim the right to use the term "cure" for cancer. The suggestion that the use of the term "cure" in a case of tuberculosis is the same as for cancer few doctors will accept. Cure for tuberculosis is due not to local application or resection but to improved resistance of the whole body—no such claim can be made for cancer even when hormones are used.

While the physician successfully treating a case of tuberculosis can speak of a cure with assurance that it will not cause or even contribute to the patient's death, no doctor has any right to say that he has cured one case of cancer of the breast, no matter what agent he has used, for he has made a local application but not changed the pabulum on which the cancer cell develops. They usually do develop, but he cannot even say how long it will be before the secondary growths will kill the patient—it may be a few months to several years—but in the end (barring accidents) it is the cause of the death. One has but to see the post-mortem to realize that the tissues have a pabulum on which cancer cells thrive, and not until we have found something which will change this pabulum shall we have a cure. Too much reliance is placed on histological interpretation in estimating cures for cancer.

Dr. Donaldson may find it "a little difficult to unravel" the errors of omission or commission, but I have shown that they are committed even by the cancer experts; they cannot all be placed to the credit of the "ignorant" general practitioner. What I call the "Propaganda of Fear" is that which forces the dread of hidden disease, for instance the dreaded cancer, on the attention of healthy people. The experts have so abundantly advertised their wares for years that the public are well educated in the signs and symptoms and the means employed. Has Dr. Donaldson never heard the patient with a large fungating tumour, when asked why she did not go sooner to the doctor, reply, "I thought it was cancer, doctor"? The so-called education only increases this fear without conferring any benefit. Will cancer detection clinics compensate for this propaganda of fear? I saw these in operation throughout the United States but, to be just, I will use evidence culled from Dr. Donaldson's own observations. The rule is that cancer detection clinics are only for people without symptoms. The examination comprises a complete history, examination of scalp, ears, mouth, nose, larynx, palpation of glandular areas, auscultation of heart and lungs, abdominal palpation, bimanual examination of the pelvis, examination by speculum, taking of smears, rectal examination, and inspection of legs and feet. This takes at least 20 minutes for each patient, and in addition every patient also has a radiograph of the chest, a blood count, a urine analysis, serological tests, and such other examinations as appear to be indicated. This is what constitutes a check-up of a healthy person. How many of our people who go to the doctor *complaining* of ill-health get such an investigation? How can any community afford it? And, since we know no cure for cancer, what would it profit us?

In his pamphlet on *Fear and Ignorance are the Enemies*, Dr. Donaldson says, "There is nothing that can be avoided in order to prevent the disease occurring and *the all-important thing is to treat the disease in its early stages*" (his italics). This surely is a hopeless attitude which must strike fear into all who have experience of cancer. We have learnt nothing of material value for successful treatment of cancer from the millions of resections and amputations; and when all can be diagnosed early and promptly so treated we shall have lost every chance of discovering a cure. Only by treatment of the patient with the lesion intact will it be possible to discover a cure; more important still is it that we seek to discover what "can be avoided to prevent the disease occurring."

My friend Dr. N. S. Finzi (December 1, p. 1337) states he is astounded at my pessimism. Has his optimism a firmer basis? He tells me that he has had 50 years' experience (during which he must have treated tens of thousands of cases with radium and *x*-rays) and that he has had two "cures" of 40 years' duration, both proved by section. I should have expected him to have had very many more such cases, for in my experience the *error* in interpreting histological evidence is much greater than that. This prevents me from accepting such evidence as infallible. The "progress" in world radiation therapy is sheep-like, extravagant, and expensive—we need a mutation to create a genius who will lead us to a different line of activity.

Once again I suggest that the average citizen should have enough intelligence to tell him when to consult his doctor, and the average doctor has the ability to recognize essential signs and the best-known means of treating them. Let him do it quietly as befits the physician, for he has nothing spectacular to offer.—I am, etc.,

Birmingham. JAMES F. BRAILSFORD

Invite Russian Doctors

SIR,—I write to express my warm approval of the suggestion made by Dr. R. L. Kitching (December 1, p. 1337) to invite Russian doctors to England. Apart from the very obvious contribution to world peace that such a visit would make it would also be of considerable medical interest.

I met and entertained a Russian doctor earlier this year and was very interested to hear of the considerable original research being done in the field of physiology and cellular pathology. It also seemed to me that such principles as the requiring of consultants to work as general practitioners for a fixed period each year—as is the Russian practice—raise interesting suggestions for our own health service.

I hope I have provided another reason for the B.M.A. to adopt Dr. Kitching's suggestion.—I am, etc.,

Liverpool. C. TAYLOR.

SIR,—As one of those who has already participated in a peace-making experiment initiated by the U.S.S.R. I should like to give my whole-hearted support to the suggestion made by Dr. R. L. Kitching (December 1, p. 1337) that the B.M.A. should invite Russian doctors to visit this country. When doctors meet on the common ground of their own specialty the cloak of their different nationalities falls in the thrill of discussing the yet-unsolved problems of the profession the world over.

To visit the Soviet Union is an unforgettably stimulating experience, and an exclusively medical group could study in greater detail than a mixed delegation the structure and methods employed in the Soviet health services, to the benefit of this country. What is equally certain is that similar facilities, granted to our Russian counterparts, would enable them to observe those particular aspects of our medical and social services in which we are ahead of them—hospital equipment, sanitation, etc.

I was informed when I brought up the question of specialist delegations at the Kiev Medical School, and again in Moscow, that the correct approach would be through the appropriate learned societies; the S.C.R., through its Russian equivalent V.O.K.S., would advise on the matter.—I am, etc.,

Sheffield. CATHERINE H. WRIGHT.

Laryngeal Vertigo

SIR,—In view of recent correspondence (December 1, p. 1340) I would like to report the following case.

A 21-year-old bank clerk was seen on October 4 on account of attacks of unconsciousness following cough. The first attack occurred in April, 1948, during service in the R.A.F. The patient was walking in company and suddenly found himself unable to reply to a question though still able to breathe. He dropped to the ground and was unconscious for a brief period. He was discharged from the R.A.F., and has since suffered from similar attacks on an average once a month. There is an awareness of impending attack. This is described as giddiness, but seems less a true vertigo than simple lightheadedness. Usually a tickling in the throat ensues, though not invariably, then a slight cough to clear the throat, and unconsciousness which lasts for a brief period.

The patient is intelligent and co-operative, and has attempted to classify possible causal factors. He smokes very little, but he volunteers the fact that on three occasions an attack has followed the consumption of one glass of gin and Italian vermouth, about half an hour afterwards. There is no complaint of nose or throat. The nasal airways are clear, the larynx is healthy, the hearing good, tonsils and adenoids have been satisfactorily removed, and sinus radiography fails to reveal evidence of pathological change.

This case is reported here because it seems to be an excellent example of the condition described by Charcot in 1876 as laryngeal vertigo. It may be that the state described has its roots more in the pharynx than in the larynx, and also that it is not a true vertigo. But it appears to be a separate clinical entity which is not very well understood, either in aetiology or in treatment. The two principal features in the condition are the soft tickling cough, with or without aura, and instant momentary unconsciousness. These patients cannot, I think, be categorized as true epileptics, but clearly they present a condition which may be of very active medico-legal importance. It is thought that the condition may be more familiar to the family doctor than to the hospital physician. The bibliography of the condition was extensively investigated by D. K. Adams in the *British Medical Journal*, 1936, **1**, 685.—I am, etc.,

Glasgow. GAVIN YOUNG.

Hip Reconstruction by Acrylic Prosthesis

SIR,—Mr. William Gissane's thoughtful letter (December 8, p. 1401) on the subject of acrylic prosthesis will be widely read by all those interested in traumatic surgery. It may therefore perhaps be pertinent for one of those who have partially accepted the dogma of a "distinguished British surgeon" to try to justify himself.

Perhaps I am unfortunate to be one who has obtained union in only 50% of Smith-Petersen nailings. I feel, however, that the majority of orthopaedic surgeons who submit their results to critical scrutiny may experience similar findings. Many, doubtless, will also have had the mortifying experience of performing a technically good operation using a Smith-Petersen nail and seeing extrusion take place, with collapse of the femoral head, even after several months of weight-bearing. Is avascular necrosis the result of bad nailing? The fracture which appears to be particularly susceptible to such behaviour is undoubtedly the subcapital one, and it is precisely this type, if no other, in which the acrylic prosthesis would seem to have particular application. The operation of replacement of the femoral head by acrylic prosthesis, as Mr. Gissane has so truly pointed out, is undoubtedly a precision one. I have found, however, that in the elderly it is hardly more shocking than the nail procedure and can frequently be completed in less than one hour. During the nine months in which I have used the acrylic prosthesis in the treatment of fractures of the subcapital region I have had no deaths, no complications, and in all cases the patients have been walking well with the aid of two sticks at the end of the tenth post-operative week.

In conclusion I would tentatively put forward a plea, not for the abandonment of the Smith-Petersen nail, but for its more judicial use. It would seem that these methods of treatment, far from being antagonistic, are in fact complementary. One of the most important objects in the treatment of fractures of the elderly is surely rapid mobilization and with the least splinting. If one accepts the fact that fractures in the basal region, or perhaps even distal to the mid-cervical area, constitute a relatively easy problem of union, it is surely here that nails of one type or another must have their greatest application. In fractures of the subcapital region, however, where the prospects of union are undoubtedly poor, an operation which will ensure rapid mobilization with weight-bearing must surely attract many surgeons. Replacement by the acrylic prosthesis at the present state of our knowledge would surely come closest to achieving these primary objects of treatment.—I am, etc.,

West Hartlepool. A. WEBB-JONES.

Malaria

SIR,—Dr. H. G. Calwell (November 24, p. 1280) deserves support in his challenge to the statement contained in the article by Sir Gordon Covell in your issue of October 27 (p. 1021). I used intramuscular quinine for many years in the Tanganyika Territory and consider it to be a measure of value in the treatment of malaria. Residents of all nationalities in East Africa place much faith in the practice. It is of the utmost importance in the treatment of children, and I should have considered it to be unwise to leave a very sick child without such an injection.—I am, etc.,

Edinburgh. JOHN HARKNESS.

Convalescent Home for Medical Practitioners

SIR,—Owing to the stress and strain of present-day practice medical practitioners are finding it more difficult to maintain good health. When they are feeling run-down they tend to carry on with their professional work until they literally drop. It is hard to imagine a more pitiable sight than an ailing doctor. His plight is often aggravated by the well-intentioned sympathies of his patients. If he is not ill enough to take to his bed he might be fit again in a short space of time if he could have a respite from work for a few weeks away from his practice.

There seems to me to be a great need for the establishment of a convalescent home run solely for the benefit of medical men and women, a home to which they could retreat and refresh themselves as circumstances demand. I would like to draw the attention of your readers to the existence of a convalescent home run by our friends, the members of the Pharmaceutical Society of Great Britain, for the benefit of their members and wives or husbands.

This home is a fine example of the smaller type of English country mansion, built of stone about 50 years ago, standing in its own grounds and situated in ideal surroundings in a country district of Derbyshire. It was purchased by their benevolent fund in 1948 and was maintained entirely from that fund. Some two years ago a special fund was commenced, the income from which, it is hoped, will ultimately be sufficient to meet the cost of maintenance. Various rooms have been adopted by branches of the Pharmaceutical Society, who have raised among their members funds from which to provide the furnishings. Other branches have given separate items of furniture or equipment, both for the house and for the grounds. The home has been modernized, is under the supervision of a lady warden, and the present weekly charge is £1 11s. 6d. for each person accommodated.

A convalescent home under the control of a subcommittee of the British Medical Association and run on similar lines for the benefit of members of the medical profession should prove to be a boon to doctors recovering from an illness and in need of a rest or recuperative holiday.—I am, etc.,

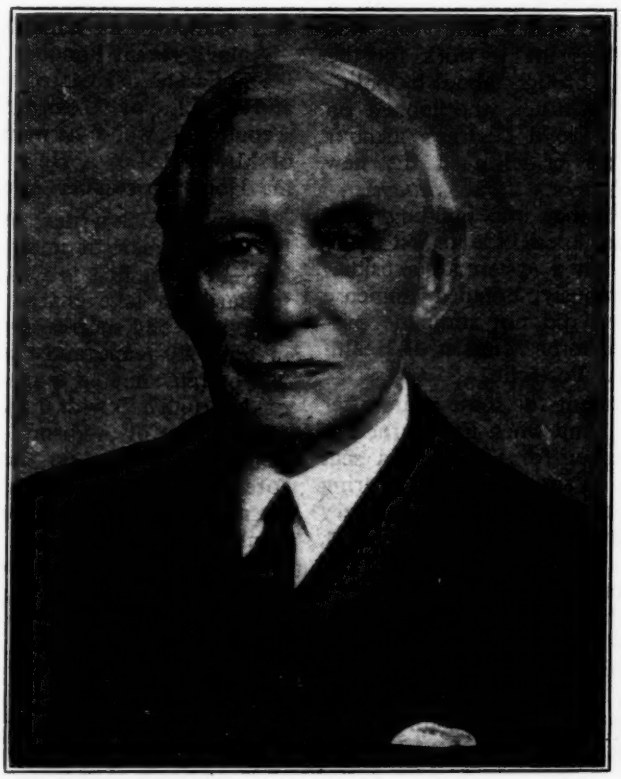
London, N.W.6. JOEL GREEN.

Obituary

LORD ADDISON, K.G., P.C., M.D., F.R.C.P., F.R.C.S.

We record with deep regret the death on December 11 of Lord Addison, the first Minister of Health and among the most distinguished of contemporary statesmen. He was 82 years of age.

It is not easy to find a parallel to the career of Christopher Addison, the professor of anatomy who left his lecture desk and dissection table to explore the anatomy of government and occupy high offices in the State, but by a coincidence Lord Addison's immediate predecessor in the presidency of the Local Government Board, Sir Auckland Geddes, also left a professorship of anatomy—at McGill University—to take in succession four important posts in the Lloyd George Government.



Walter Stoneman, London]

The future Lord Addison was born in 1869 in a village bearing the characteristically Lincolnshire name of Hogsthorpe. His association in late life with agriculture was in a sense a return to his native soil. He was educated at Trinity College, Harrogate, and took his medical training at St. Bartholomew's, qualifying M.R.C.S., L.R.C.P. in 1891. He took the London M.B., B.S. in the following year, and proceeded M.D. in 1893, and in 1895 became Fellow of the Royal College of Surgeons of England. He was elected F.R.C.P. in April this year. Anatomy was his chosen subject, and after holding the chair of anatomy at University College, Sheffield, he returned to London, first as lecturer at Charing Cross Hospital Medical School (he became dean there in 1906) and later as lecturer and senior demonstrator at Bart's. He was an examiner for the universities of Cambridge and London.

While actively pursuing the life of a teacher of anatomy he became the secretary of the Anatomical Society of Great Britain and Ireland, and wrote a number of books and papers on anatomical subjects. In eponymous nomenclature "Addison's transpyloric plane" is one of the aids to the study of the topography of the abdominal viscera. Addison published a paper on this subject in the *Journal of Anatomy and Physiology* (1899, 33, 565). He was the editor of the twelfth edition of that well-known textbook, Ellis's *Demonstrations of Anatomy*, and the author of a memoir published by University College, Sheffield, on the topographical anatomy of the pancreas and adjacent viscera. Many contributions from his pen appeared in the *Proceedings* of the Royal Society and in specialist journals. He was a member of the Faculty of Medicine of the University of London, chairman of the Board of Intermediate Medical Studies, and a member of the Board of Human Anatomy and Morphology. In 1901 he was Hunterian professor of the Royal College of Surgeons.

At the age of just past 40 his ambition turned from these quiet fields to a career in politics. He was returned to the House of Commons as Liberal Member for a London constituency—one of 13 medical men who were sent to Parliament in January, 1910. One of his first acts in Parliament was to present a Bill providing for instruction in the care and feeding of infants and in simple domestic hygiene to be given to all senior girls in public elementary schools. He occasionally contributed notes to this *Journal* about Parliamentary affairs. His pertinacity and persuasive speech soon marked him out in the House of Commons, and he was ever at the right hand of Mr. Lloyd George during the stormy passage of the National Insurance Bill. When the outbreak of war in 1914 caused some resignations from the Asquith Government, Addison entered it as Parliamentary Secretary to the Board of Education. Very soon he was transferred to the Ministry of Munitions, where he served under Mr. Lloyd George, and, on the latter becoming Premier in 1916, he succeeded him as Minister. For a time, therefore, the talents which had been devoted to the study of the delicate structure of the human body were turned to the production in prodigious quantities of the means of shattering it in the shortest possible time. A post probably more suited to his temperament was presently found for him as Minister of Reconstruction—the only Minister to bear that sole title.

In 1919 he became president of the Local Government Board. The Ministry of Health was then in the shaping, and Addison was the obvious choice for first Minister. Whatever critics may say of his occupancy of other Government positions, here he was undoubtedly in his element. He showed his mettle in his very first act as Minister, which was to reserve for the services of the Ministry two men and one woman of great departmental experience—the late Sir Robert Morant, the late Sir George Newman, and Dame Janet Campbell (now Heseltine). The death of Morant not very long afterwards was a severe blow to Addison, as it was to many others, and not least to the National Health Insurance medical service. Addison recalled what a privilege it had been to ask Morant to become the first Secretary of the new Ministry of Health, and

thus to enable him to achieve the great ambition of his life.

It was during Addison's tenure of office that the insurance capitation fee was raised to its highest figure—11s. in 1920. Though never a practising doctor, he knew something of the difficulties of the medical profession. In those early days, too, when it was important to have a group of medical men in Parliament able to voice the opinion of the profession during a reconstructive period, Addison was always on the lookout for a likely candidate, whether of his own party or another. While listening to a speech at a medical dinner by someone who evidently knew what he was talking about he was overheard to say, "We must have that man in Parliament," and, sure enough, his name figured as a candidate at a forthcoming by-election. Addison's departure from office after two and a half years was not due to any lack of success in his work for the health services, but was largely brought about by political opponents of the Prime Minister who looked on Addison as a weak joint in Lloyd George's armour and found a good target for criticism in the new Ministry's housing schemes. As the *Manchester Guardian* has remarked, "Finance and building were subjects of which he (Addison) knew little at first hand. He allowed himself to sanction a system of subsidies which sent up prices enormously, entailed immense burdens on the taxpayer, and did not stimulate production," so in 1921 he ceased to be Minister of Health and became Minister without Portfolio.

Addison was out of Parliament for some years after the General Election of 1922, and when he returned in 1929 it was as Labour Member for Swindon—a seat which he won and lost and won and lost again. During his second term in Parliament he was Parliamentary Secretary to the Ministry of Agriculture in 1929–30, and afterwards Minister in 1930–1. Existing schemes for marketing farm produce owe much to his influence. After his retirement he wrote a book outlining a policy for agriculture in which he declared again his faith in the national ownership of land. No enterprise, he said, was more worthy of national effort, more creative of the best wealth, or more pregnant for the people's good than the restoration of the neglected countryside. As with his famous chief, Mr. Lloyd George, farming was the interest of his later years—he had a farm near High Wycombe in Buckinghamshire—but he also wrote much on social questions, being assisted in his literary labours by his first wife, whom he had married in 1902 and who died in 1934.

In 1937 he was raised to the peerage as Lord Addison of Stallingborough, and for some years thereafter he was an effective leader of the Labour Party in the House of Lords, giving useful critical support to the Government during the war years. When the National Government was dissolved in 1945 he received a viscounty, and after the new Parliament met he became, at the age of 76, Leader of the House of Lords. From 1945 to 1947 he was Dominions Secretary (later Secretary of State for Commonwealth Relations), but to ease his burden Mr. Attlee then appointed him Lord Privy Seal. His tactful handling of the nationalization Bills won him respect from all parties, and it was largely due to his influence that a serious clash was avoided between the two Houses on the reform of the second chamber. Earlier this year Lord Addison was appointed Lord President of the Council when Mr. Morrison went to the Foreign Office.

An appointment for which he was well suited by qualification and experience came to him only three years ago, when he was made chairman of the Medical Research Council. He was closely concerned with the setting up of the original Medical Research Committee, which under the National Health Insurance Act of 1911 obtained its income in the form of a grant from the Treasury of 1d. for every insured person in the country. He was himself a member of the Committee during the whole of its existence, from 1913 to 1920. It was when he was Minister of Health that the constitution of the Medical Research Council was being considered, and it was due to his arguments that the Council was brought under the general direction of a special committee of the Privy Council, a measure which gave it far more independence than it could have achieved as a branch of an administrative department.

Among recent honours Lord Addison received were the honorary degrees of Sc.D. of Cambridge (in 1949) and D.C.L. of Oxford (in 1950). Lord Addison's second wife, whom he married in 1937, was the daughter of Mr. J. P. Low. He is succeeded by his son, Major the Hon. Christopher Addison.

LORD HORDER writes: When Addison left the Sheffield University chair of anatomy—almost exactly 50 years ago—he went first to Charing Cross and then returned to Bart's to take charge of the anatomy department. A popular and successful teacher, Addison made history in both academic and clinical anatomy, and his name will be remembered in connexion with surface markings of the trunk and with the topography of the peritoneum. Only a few of Addison's intimate friends knew of his political leanings—on the Liberal side—and it therefore was a great surprise to most of his colleagues when he made a *volte-face* from the dissecting room to the House of Commons and, later, to the Upper Chamber. But the capacity for hard work in his job which he showed in his earlier career was equally apparent in the later one. So also was his capacity for making, and for keeping, friends whose loyalty was as lasting as his own.

SIR CECIL WAKELEY, P.R.C.S., writes: The passing of Lord Addison removes from the medical profession one who was a pioneer in anatomical research, although for the modern generation of medical men he was not associated with medicine but with politics. His fame will go down in history as much in the realm of anatomy as in the field of politics, for every medical man and woman has to learn about "Addison's transpyloric plane." It was after he had returned to London from Sheffield that he became associated with Sir Arthur Keith and examined for the primary Fellowship examination of the Royal College of Surgeons of England for a period of ten years. Addison was a prolific writer in anatomical journals, and for some years was editor of the *Quarterly Medical Journal*; he also edited the twelfth edition of Ellis's *Demonstrations of Anatomy*.

Although engrossed almost entirely in politics during the last thirty years of his life, Addison always maintained his interest in the Royal College of Surgeons and in medical activities generally. He was made Chairman of the Medical Research Council in 1948 and showed great interest in the multitudinous fields of research in this country. He attended many lectures at the Royal College of Surgeons and was himself a Hunterian Professor of the College. One of his last appearances at the College was in 1950, when he attended the 150th anniversary celebrations and was a guest at the dinner.

SIR ARTHUR MACNALTY writes: In 1905, at Sir Frederick Mott's house, I first met Christopher Addison. Mott mentioned that I was doing research work with Sir Victor Horsley, and Addison gave me some useful information about the technique of dissecting the cerebellum. I was impressed with Addison's clear-cut features, the firm nose and mouth, the keen appreciative eyes, and the fine head crowned with grey hair. His speech was clear and fluent and he always retained his Lincolnshire accent. He was then lecturer—a brilliant one—on anatomy at Charing Cross Hospital, but already cherished the hope of a political career, although he did not enter Parliament until 1910. This career has overshadowed his distinction as an anatomist, but after his lectureship at St. Bartholomew's Hospital he held the chair of anatomy in the University of Sheffield, was secretary of the Anatomical Society of Great Britain and Ireland, and examined in anatomy in the universities of Cambridge and London and for the primary Fellowship. His anthropological studies in Abyssinia are perhaps not so well known as some of his other work.

His services to social reform, medical research and progress, and public health were outstanding. It was owing to his knowledge of medicine and medical practitioners that the negotiations with the doctors were successful in 1911 and that National Health Insurance after much opposition was found to work so smoothly. With Lord Moulton, Sir Robert Morant, and Sir Walter Fletcher Addison had a large share in planning the initial work of the Medical Research Council (then the Medical Research Committee) and enabled it to embrace the whole field of medical research instead of being restricted chiefly to investigations on tuberculosis, as at first planned. It is significant of his continued interest in this work that his last ministerial appointment in the last Labour Government was that of Lord President of the Council, which brought him again into close touch with the Medical Research Council's work.

For over two years at the Ministry of Health I saw much of Lord Addison, and he personally entrusted me with some special inquiries for the Department. Unfortunately nearly all his time was taken up with housing legislation, or I feel sure he would have been not only the first but a great Minister of Health. He discussed many hospital and medical problems with Sir George Newman, Lord Dawson, and me, and showed both administrative and technical mastery of the subjects under review, but he resigned too soon for his wisdom in these matters to bear fruit. On the day of his resignation he sent for me and we walked across the Horse Guards Parade to Pall Mall together. He told me how deeply hurt he was by the way he had been treated, but he added, alluding to his speech in the House of Commons, "I think I brought the crockery clattering about their ears." Later, as Chief Medical Officer of the Ministry, I met Lord Addison on several committees. He was always wise, patient, tactful, and understanding. Medicine, indeed, owes much to him.

There is an interesting historical link between anatomy and statecraft. Sir William Petty, Sir John Finch, Lord Ilkeston, and Lord Geddes, like Lord Addison, were all formerly professors of anatomy. Lord Addison was the first medical man to be created a Knight of the Garter, and he valued the honour alike as a statesman and as a tribute to the profession of which he was ever a loyal and devoted member.

MR. WALTER ELLIOT writes: Addison's wide span of active life covered three periods, each of much moment, in three very different spheres—professional life, the House of Commons, and the House of Lords. The circles of to-day grew accustomed to "Lord Addison" and almost lost sight of his earlier work. But those of us who served with him in the House of Commons will always remember him first and foremost for his work there.

Addison had pre-eminently the gift of identifying himself with the environment in which he moved. Usually the great professions set an ineradicable mark upon a man—medicine more deeply than most. For example, Sir Auckland Geddes, another professional man turned administrator, always carried about him a faint whiff of the lecture-room. Addison was primarily a Member of Parliament, later a Minister. He moved easily and powerfully in each of these new surroundings.

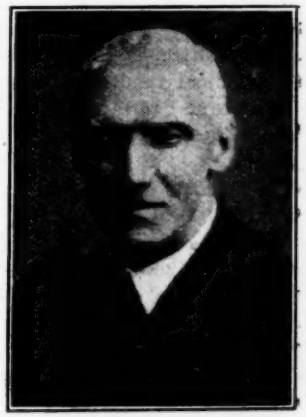
His achievements in Parliament were noteworthy in agriculture as well as in the many duties which used to come under "health." His housing work suffered from the disadvantages of a pioneer. In actual promotion of public health measures, whether legislative or administrative, he was indefatigable. In all this great ministry he maintained, always, the quality of enthusiasm.

In agriculture, later, he surprised many by his ingenuity and application. No one ever worked harder or to better purpose. Nor did this power of toil ever desert him. In the Upper House he worked almost to his last hour, and died in harness, still capable, still vigorous. His death, truly, was in character with his life—that of the Happy Warrior.

HENRY STANLEY RAPER, C.B.E., D.Sc., M.B. F.R.C.P., F.R.S.

Professor H. S. Raper, dean of the medical school of Manchester University and professor of chemical physiology, died in Manchester after a short illness on December 12.

Henry Stanley Raper was born in 1882, the son of James Raper, of Bradford, Yorkshire. He was educated at Bradford Technical College and the University of Leeds, where he had a prize-winning career as a student and graduated B.Sc. in 1903 with first-class honours. The next three years he spent at the Lister Institute in London with J. B. Leathes, in collaboration with whom he published a work on fats. After further study at Strasbourg University he returned to Leeds to complete his medical course, graduating M.B., Ch.B. with honours in 1910. In the same year he was awarded the D.Sc. for his original researches. Toronto University then invited him to accept a post as lecturer on pathological chemistry, and he remained in Canada from 1910 to 1913. He returned to Leeds, however, and was appointed professor of physiology and biochemistry in 1913. In 1916 he joined the R.A.M.C. and became commanding officer



[Walter Stoneman, London.

of the Anti-Gas Establishment of the Royal Engineers. For this work he was awarded the C.B.E.

In 1923 Raper accepted the offer of the Brackenbury professorship of physiology at Manchester University in succession to Professor A. V. Hill, who had returned to University College Medical School. At Manchester he reconstituted the tradition of research founded by Arthur Gamgee, the first occupant of the chair. He also applied the knowledge gained by physiological research to clinical studies, just as Professor (now Sir John) Stopford was doing with anatomy, and together they were instrumental in forming a new department of clinical investigation at the Manchester Royal Infirmary. They were both made honorary advisory members of the Infirmary's medical board and they also represented the university on the Dickinson Trust, the object of which was to promote medical research. The clinical investigation department of the Royal Infirmary was placed under a director with medical and chemical qualifications, and Raper paid regular visits to it in its developing years. The clinical and therapeutic research done in this department proved to be of great value. Under Raper's guidance new lectureships were instituted at the University on experimental physiology and physiological chemistry, and an appointment was also made of a reader in human physiology in its direct application to clinical investigation. As a member of the Committee on Cancer Research at the Holt Radium Institute, he also took a leading part in cancer research in Manchester, especially in the investigation of epithelioma of the skin in cotton spinners caused by mineral oils.

Professor Raper was elected F.R.S. in 1929 for his work on fats and carbohydrates (subjects on which he published many papers), and F.R.C.P. in 1938. Leeds University awarded him an honorary LL.D. in 1943. From 1933 to 1939 he was a member of the Medical Research Council, and in 1943 he succeeded Sir John Stopford as representative of Manchester University on the General Medical Council. Several universities appointed him an external examiner. He was president of the Manchester Medical Society for a session, and when the British Medical Association met at Manchester in 1929 he was president of the Section of Physiology and Biochemistry. Five years ago he became dean of the medical faculty at Manchester University (the first whole-time dean) and professor of chemical physiology. From these posts he was due to retire at the end of the year. Since 1948 he had been a member of the Manchester Regional Hospital Board and of the Board of Governors of the United Manchester Hospitals.

He was a striking figure, over six feet in height, broad, but somewhat loosely built, and with white hair from a quite early age. He was a scientific gardener, and in his home at Prestbury, on the edge of a small valley, he cultivated his rock garden and herbaceous borders with keen interest. As a Yorkshireman he watched with anxiety the outcome of the two annual matches between the rival Roses.

CLEMENT A. FRANCIS, M.B.

MR. MORTIMER WOOLF writes: The sudden passing of Clement Francis, at too early an age, has bereft his friends and colleagues of a dear personality, and the profession, which he loved, of a loyal and devoted worker. Francis was a man who exuded geniality and friendship. No one could be with him for even a short period without feeling that here was a man whom one had not only wanted to know but indeed had known for a long time. Everything he did—and he accomplished much—he did with all his might. He was a man of many interests, each of which he took seriously. During his summer holiday he seemed very fit and played cricket, at which he was no mean performer, in a number of matches at Frinton. It was good to hear him talk with zest and yet with modesty of some of his successful innings. And yet, only a month or two later, the fatal blow occurred. As honorary secretary of the Hunterian Society Francis was more than a loyal worker—he was a power. He was so keen he had the faculty of injecting his enthusiasm not only into his fellow members on the council but also into his invitations to the various speakers. It is no exaggeration to say that he was beloved by all with whom he came in contact. His passing has brought much sorrow, and a sharpened appreciation of all he stood for, all he accomplished.

Dr. HERBERT CECIL BARLOW, for many years honorary physician to the Lincoln County Hospital, died at Lincoln on September 2, aged 77. He was born at Gravesend, but spent most of his early years in Leicestershire, where his father was a clergyman. From Wyggeston Grammar School he went on to the Westminster Hospital with an entrance scholarship. Qualifying in 1898, he graduated M.B.(Lond.) in 1900. He was a senior house-physician and obstetrical house-physician at the Westminster Hospital, and then went into general practice in Huntingdonshire, where he spent about eight years. He came to Lincoln in 1910 and was in general practice until 1920, when he was appointed physician to the County Hospital, Lincoln, and became the first whole-time specialist in the city. He gave 28 years of devoted service in that appointment and as physician to cottage hospitals in the county. Cecil Barlow was a most able physician and took a great interest in all branches of medicine. Unsparing in his work at the hospital, he was a friend and adviser to countless doctors in the district. To the great loss of his colleagues, who made him a well-deserved presentation, his services were dispensed with on the "appointed day" in 1948. In his younger days he was an enthusiastic tennis player and a keen game-shot of considerable skill. He was well read, with a particular knowledge of and love for Dickens. Greatly liked by all who knew him, he was a true and faithful friend to many. He leaves a widow and a son and daughter, his elder son having been killed in the last war in France.—G. C. W.-C.

Dr. ANNIE MARGARET MCGRATH, senior consultant pathologist to the Mid-Herts group of hospitals, St. Albans, died in London on September 15 at the age of 58. After taking an Arts degree at London University, with first-class honours in English, in December, 1914, she applied herself to war service, and it was not until she was free in 1922 that she decided to study medicine at the Westminster Hospital Medical School. In her younger days she was a useful athlete, gaining her London University colours for swimming and rowing, and playing hockey for her college. After qualifying in 1927 and serving for six months as house-physician to the late Dr. David de Souza, she decided to specialize in pathology and spent nearly two years in the John Burford Carlill pathological laboratories, where she worked in close association with the late Dr. J. A. Braxton Hicks and Dr. F. D. M. Hocking. In 1929 she left the Westminster Hospital to take up an appointment at what was then the Herts County Mental Hospital at Hill End, St. Albans. It was at this time that she graduated M.B., B.S. and took the D.P.M. Before long the volume of work being sent in by hospitals in all parts of Hertfordshire was too much for the existing accommodation and necessitated

the erection of a larger and better-equipped laboratory. What was virtually the county laboratory thus came into being, and it was placed under Dr. McGrath's charge, where it remained. Her work brought her into contact with most of the practitioners in Hertfordshire, and she numbered many of them among her closest friends. She was a very old member of the Association of Clinical Pathologists and among the most loyal in attendance.

I. J. S. writes: Dr. McGrath's staff held her in great affection, and among themselves technicians and others always referred to her as "the lady." She will be remembered by them for her many spontaneous acts of kindness and for her unfailing concern in their welfare, giving kindly advice backed by a wealth of common sense and sound practical help. Few outside the actual recipients knew of her generosity to the needy or distressed, and she had a like regard for dumb animals, particularly horses and dogs. Typically, she ensured that the societies undertaking the care and protection of these creatures should not lose by her death. Writing not only as a medical colleague and fellow pathologist, but as one who received the benefits of her friendship for many years, I find it difficult to do justice to one whose professional and personal attributes were impeccable. Hers was an outstanding personality with a strength of character belying the frailness of her physique. Of all her qualities those which perhaps stand out most vividly were her kindly understanding, loyalty to friends, and overwhelming sincerity. Her profession was her vocation, and Hill End Hospital, to which she gave over 20 years of devoted service, will be the poorer for her passing.

Miss ROSE MURLIS SIMMONDS, a pioneer of dietetics in this country, died at the London Hospital on October 12, aged 65. When she was a young probationer at the London Hospital she visited Florence Nightingale. During the first world war she joined the Queen Alexandra's Imperial Military Nursing Service, and was decorated with the Royal Red Cross for her work in France. Returning to the London Hospital in 1919 (she gave the first injection of insulin to a patient there in 1922), she took an active part in the expansion of the science of dietetics, as a result of which she was awarded the first travelling fellowship by the Rockefeller Foundation to study dietetics in the United States, and she later became the first trained dietitian to work in the United Kingdom, when she was given charge of the London Hospital's newly established metabolic ward. During the illness of King George V in 1928 she was called as a member of the nursing team to give dietetic advice. She left the London Hospital in 1936 to open the new dietetic department in the Hammersmith Hospital, where she remained until her retirement in March, 1951, though she continued to serve as visiting dietitian to a number of London hospitals. During the last war she was for a short time on the food advice staff of the Ministry of Food, and in 1946–7 she went to Germany as a member of the British Red Cross Commission, reporting on the condition of children in Berlin and the Ruhr. She was a member of the Women's Advisory Council of the Nuffield Trust and of the Nuffield Provincial Hospitals Trust. A foundation member of the British Dietetic Association, she was its chairman from 1936–44 and chief editor of *Nutrition, Dietetics, Catering* from 1949 until the time of her death. Throughout these years she played an outstanding part in forming the association's policy.

Dr. VICTOR FANSTONE MASTERS died on November 4 at Umtali, S. Rhodesia, at the age of 34. After leaving Epsom College, he entered King's College, London, and from there proceeded to Charing Cross Hospital, qualifying in 1940. Under the E.M.S. he became assistant surgeon in orthopaedics and general surgery at Ashridge Hospital until 1945. He then served in the R.A.M.C. as a captain, being graded as an orthopaedic specialist. In April, 1948, he set out with his wife and family for Mount Silinda, Umtali, Southern Rhodesia, to take up his life's work under the American Board Mission. The first eight months were spent at a 20-bed hospital-dispensary at Chikore, where he studied the people and their language. Then he took over the Mount Silinda Mission Hospital of 60 beds, and with his colleague doubled the number of admissions within two years. The scope of operative surgery was also increased. Apart from this, he paid numerous visits by car to dispensary outposts, and would often stop on the wayside to give treatment. Much was done to break down the irrational and dangerous African customs connected with childbirth, and mass injections for bilharzia were started. Through the past three and a half years not only did the sphere of medicine expand but the Christian gospel was brought into the lives of many. Just when such great progress was being made Dr. Masters's family was struck with poliomyelitis. His daughter, aged 4, died suddenly, apparently from malaria and dysentery. Then his wife became paralysed to the waist, and poliomyelitis was diagnosed. Their youngest son, aged about 18 months, also became critically ill, and was paralysed completely except for one hand. Finally, Dr. Masters himself developed the disease and died. His wife and youngest son are now progressing, and the older boys, aged 8 and 7, are well. Mrs. Masters, to whom our very sincere sympathy is extended, hopes to overcome her disability and, if possible, continue working in the Mount Silinda Mission Hospital.

Medical Notes in Parliament

Private Members' Bills

Two Private Members' Bills of medical interest were presented on December 5, and are due to be read a second time on March 14. One deals with fireguards, and proposes that the sale of certain heating appliances without an effective fireguard be prohibited. This Bill was presented by Mr. D. G. BULLARD. The other, presented by Mr. SOMERVILLE HASTINGS, proposes to make illegal "the demonstration of hypnotic phenomena for purposes of public entertainment."

Hospital Expenditure

Responding to a request by Mr. J. E. MCCOLL, Mr. H. F. C. CROOKSHANK on December 7 set out for the financial years 1949–50, 1950–1, and 1951–2 the expenditure of the hospital authorities per head of estimated population for each hospital region of England and Wales, including therein the expenditures of boards of governors as well as those of regional hospital boards. This Table shows all expenditure other than capital outlay. The figures are based on the estimated population of each region at mid-1950.

Region	1949–50	1950–1	1951–2
	£ s. d.	£ s. d.	£ s. d.
Newcastle	3 5 8	3 13 8	4 1 4
Leeds	3 15 1	4 2 8	4 13 3
Sheffield	3 3 3	3 8 4	3 17 1
East Anglian	3 7 4	3 15 4	4 0 6
N.W. Metropolitan ..	5 17 8	6 12 0	7 5 8
N.E. Metropolitan ..	5 8 5	5 19 5	6 10 8
S.E. Metropolitan ..	5 5 4	5 16 9	6 7 7
S.W. Metropolitan ..	6 1 4	6 5 5	6 19 4
Oxford	4 0 11	4 14 9	5 3 2
South-Western	4 9 2	4 18 2	5 9 3
Wales	3 10 6	4 0 1	4 8 8
Birmingham	3 9 7	3 16 1	4 5 4
Manchester	3 9 2	3 15 0	4 3 0
Liverpool	4 7 0	4 16 3	5 5 2

Medresco Hearing-aids.—The average monthly delivery by manufacturers in 1951–2 to date is 10,200 compared with 7,750 in 1950–1.

Smoking.—Mr. Crookshank states that the Medical Research Council is pursuing inquiries on a large scale about the extent to which tobacco smoking is one of the causes of cancer of the lungs.

Accidents.—The numbers of accidents in factories notified to the Ministry of Labour under the Factories Acts for 1948, 1949, and 1950 were 182,838, 172,026, and 170,371 respectively. Of these, 552, 475, and 506 were fatal.

Medico-Legal

FATAL ANTHISAN POISONING

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

Two recent inquests on children who died after eating "anthisan" tablets show once again the importance of keeping tablets and medicines out of reach of children. Several previous cases of anthisan-poisoning in children have been reported.[1-3] A York housewife who suffered from urticaria took some tablets of anthisan (mepyramine maleate) prescribed by her doctor. A few months later, thinking they were a tonic, she offered the box with the rest of the tablets to a neighbour who complained of ill-health. The neighbour, after taking three or four, put the box in the centre drawer of her dressing-table, where they remained for over a year. Her children were in the habit of exploring the drawer, which slid open very easily. One day she found her 15-months-old daughter on the landing with her hand to her mouth and the box with some scattered tablets on the floor. The child vomited on being lifted up, and went into convulsions; she was admitted to hospital at once and died on the same day.

The necropsy showed acute emphysema and congestion. According to the pathologist's report the child had eaten up to six tablets of 1½ gr. (0.1 g.) each, an ample lethal dose. The coroner returned a verdict of accidental death, remarking that although such accidents were not frequent the public should be aware that they happened.

The importance of this warning was shown at an inquest held at Folkestone on May 18 on a boy aged 14 months. Early this year the child's father had consulted his doctor about a body rash, and the doctor prescribed anthisan tablets, each containing 0.1 g. These the father kept in an unlocked drawer which he thought was out of the child's reach.

On the morning of May 15 the child was left to walk about while his mother got his dinner, and when his brother got home from school he told her that he had found him on the arm of a chair at the dresser drawer and showed her an empty box which he had had in his hand. He was playing quite happily and she gave him his dinner and put him down to rest. It was not till her husband came in that she learnt there had been tablets in the box.

At 2.30 p.m. the child refused his milk, and after about ten minutes he began to vomit. He was admitted to hospital at 3.30 p.m. suffering from convulsions and with signs of bronchopneumonia. In spite of treatment he died at 10.15 p.m. The pathologist concluded from the amount of anthisan found on gastric washout that he had taken only two or three tablets.

The chance of further tragedies such as these would be reduced if parents for whom anthisan tablets are prescribed could be made to appreciate how deadly they can be to young children.

1 *British Medical Journal*, 1949, 1, 1098.
2 Ibid., 1950, 1, 1115.
3 Ibid., 1950, 1, 1375.

Universities and Colleges

UNIVERSITY OF OXFORD

In Congregation on November 24 the degree of D.M. was conferred on C. Ounsted.

The Board of the Faculty of Medicine has co-opted Dr. A. M. Cooke for the statutory period of two years from the first day of Hilary Term, 1952.

Dr. G. N. C. Crawford has been appointed University Demonstrator in Human Anatomy from October 1, 1951, to September 30, 1956.

UNIVERSITY OF CAMBRIDGE

In Congregation on December 1 the degree of M.D. was conferred on D. A. Pond, J. R. Tasker, and F. G. J. Hayhoe.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **December 1** (No. 48) and corresponding week 1950.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 126 great towns in England and Wales (London included), London administrative county, the 16 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 13 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1951 Eng. & Wales	1951 Lond.	1951 Scot.	1951 N. Ire.	1951 Eire	1950 Eng. & Wales	1950 Lond.	1950 Scot.	1950 N. Ire.	1950 Eire
Diphtheria	45	4	19	0	3	45	6	13	4	4
Dysentery	327	32	41	0	1	856	24	147	4	
Encephalitis, acute	8	0	0	0		0	0	0	2	
Enteric fever: Typhoid	2	0	0	1	1	1	0	0	1	2
Enteric fever: Paratyphoid	18	0	19 (B) 1(A)	2	1 (B)	8	0	5 (B)	0	
Food-poisoning	95	24		0		203	14		6	
Infective enteritis or diarrhoea under 2 years				14	21				12	31
Measles*	2,313	28	105	183	82	12,323	1210	241	126	136
Meningococcal infection	30	3	12	0	3	32	4	11	0	1
Ophthalmia neonatorum	41	2	6	0		33	4	11	0	
Pneumonia†	432	30	158	0	1	497	28	258	11	
Poliomyelitis, acute: Paralytic	39	0	9	0	1	128	3	7	1	2
Poliomyelitis, acute: Non-paralytic	17	0								
Puerperal fever§	218	22	15	1		94	7	9	0	1
Scarlet fever	1,585	150	335	27	47	1,434	93	233	40	108
Tuberculosis: Respiratory			167	42				136	32	
Tuberculosis: Non-respiratory			31	5				21	13	
Whooping-cough	1,852	48	263	45	68	4,458	417	637	25	53

DEATHS in Great Towns	1951 Eng. & Wales	1951 Lond.	1951 Scot.	1951 N. Ire.	1951 Eire	1950 Eng. & Wales	1950 Lond.	1950 Scot.	1950 N. Ire.	1950 Eire
Diphtheria	0	0	1	0	0	0	0	0	0	0
Dysentery		0		0			0		0	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years	7		0	0	1	21		2	0	5
Influenza	9	0	3	0	0	28	5	2	0	0
Measles		0	0	0	0		0	0	0	0
Meningococcal infection		1	0				1	1		
Pneumonia	175	26		6	5	198	28		13	6
Poliomyelitis, acute	1	0			1	5	0			0
Scarlet fever		0	0	0	0		0	0	0	1
Tuberculosis: Respiratory	127	16	23	1	6	182	31	40	9	13
Tuberculosis: Non-respiratory		5	2	0	0		1	4	2	2
Whooping-cough	3	0	0	0	0	6	0	1	0	0
Deaths 0–1 year	220	21	29	6	12	210	29	26	11	21
Deaths (excluding stillbirths)	4,638	687	592	89	143	5,635	851	773	154	205
LIVE BIRTHS	6,110	1059	787	182	310	6,664	1061	750	198	361
STILLBIRTHS	171	18	13			190	16	25		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Vital Statistics

Infectious Diseases

In England and Wales during the week ending December 1 notifications of measles increased by 266, scarlet fever by 109, and dysentery by 106, while the largest decline was whooping-cough 39.

The increased incidence of measles was mainly contributed by two counties, Warwickshire and Staffordshire, with rises of 111 and 66 respectively. Of the 267 cases of measles in Staffordshire 176 were notified in Stoke-on-Trent C.B. Only small variations occurred in the local trends of scarlet fever; the largest was a rise of 43 in Lancashire. The largest fluctuations in the returns of whooping-cough were a rise of 34 in Yorkshire West Riding and a fall of 38 in Southampton. During the week 16 more cases of diphtheria were notified than in the preceding week. The largest increases were Staffordshire 9 and Worcestershire 4. Only four administrative areas had multiple cases of diphtheria. They were Staffordshire (Bilston M.B. 7); Warwickshire (Birmingham C.B. 5); London (Islington 3); Worcestershire (Droitwich R.D. 2).

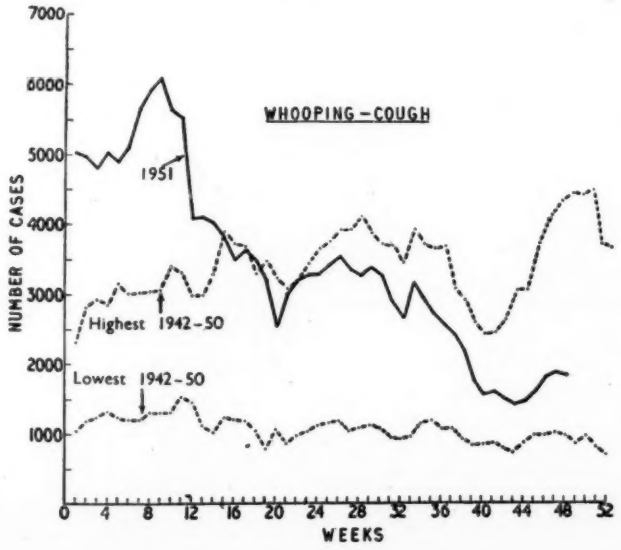
Of the 18 cases of paratyphoid fever 13 were notified in Lancashire. The largest returns in this county were Litherland U.D. 7 and Lancaster M.B. 4. In Scotland the 19 cases of paratyphoid fever were notified in the Western Area (Glasgow 9).

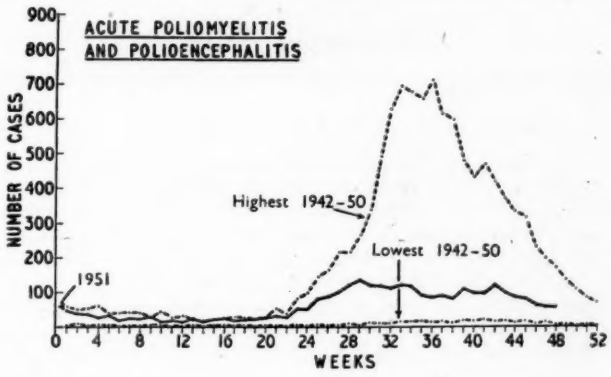
The notifications of paralytic acute poliomyelitis were two fewer, while the non-paralytic cases were one more, than in the preceding week. The largest returns were Lancashire 7 (Liverpool C.B. 3); Northamptonshire 5 (Kettering M.B. 4); Cambridge 4 (Cambridge M.B. 4); Warwickshire 4 (Birmingham C.B. 3); Buckinghamshire 4; Yorkshire West Riding 4.

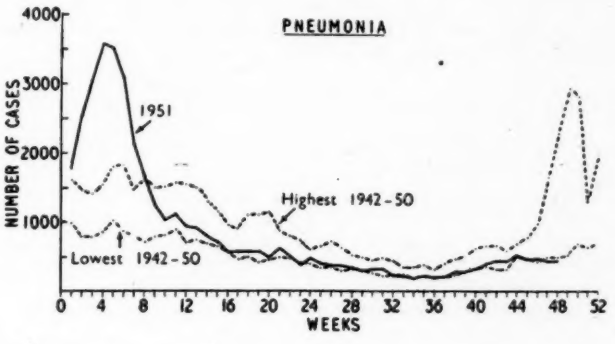
One hundred and eighteen further cases of dysentery were notified from Norfolk, Norwich C.B., where 25 cases occurred in the preceding week. Other large returns of dysentery were Middlesex 37 (Hornsey M.B. 19); London 32 (Fulham 11); Lancashire 26; Southampton 17 (Kingsclere and Whitechurch R.D. 9); Leicestershire 12 (Leicester C.B. 10).

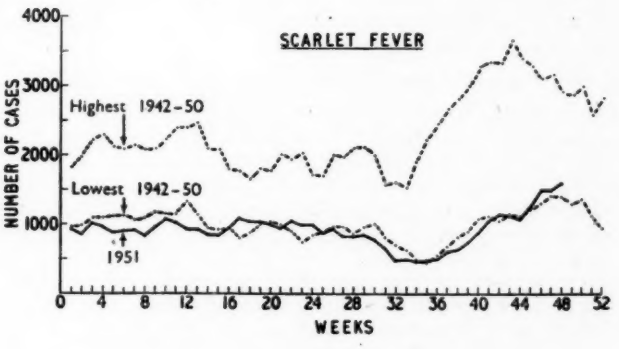
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported during the nine years 1942–50 are shown thus -------, the figures for 1951 thus ————. Except for the curves showing notifications in 1951, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









Road Accidents in October

Casualties on the roads of Great Britain in October totalled 18,597, including 430 killed. Compared with October, 1950, there was a decrease of three in the killed, but an increase of 898 in the total casualties. The number of child casualties, as in several previous months, was higher than a year ago. There were 894 casualties to children on bicycles, an increase of 176 over October, 1950. Casualties to child pedestrians increased by 34 to 2,330. These figures are given by the Ministry of Transport.

Dr. Charles Hill, M.P., gave the first of the Armstrong memorial lectures of the Royal Society of Arts on December 12, on "Food and Fads." He spoke first of the popular fallacies that children must have sweets and sugar for energy, and that they must at first be fed on mushy foods. To-day solid food was fed to babies at a much earlier age than formerly, but the love for slops still survived among some mothers. There was a persistent idea that meat and cheese were bad for children, but they were in fact good food for quite young children: cheese was once described as milk with the water squeezed out. Dr. Hill went on to attack other popular fads. Parsley was cited as an excellent source of vitamin C and iron, but by the time parsley had been chopped and heated in parsley sauce much of the vitamin must have been destroyed.

Medical News

A Book for Christmas

50 Years of Medicine, containing in book form articles surveying the progress of medicine and surgery during the first half of this century which appeared in a special number of the *Journal* last year, is again available. Very pleasantly brought out, and handsomely bound, not only does it look impressive but the information it gathers together is useful and enlightening, and is of interest to both lay and medical readers. Over 300 pages of text, a complete index, and 32 illustrations make this a valuable book to have, and, incidentally, an excellent Christmas present. Costing 15s., *50 Years of Medicine* may be obtained through booksellers, or direct (post free) from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

"Any Questions?"

The first book of "*Any Questions?*" has now been published. The book contains a selection of the best questions and answers which have appeared in the "Any Questions?" section of the *Journal* since the feature was started eight years ago. Many of these authoritative answers give practical information not yet in the textbooks. This book is confidently recommended to all practitioners. "*Any Questions?*" is strongly bound in cloth, small enough to fit the pocket, and costs 7s. 6d. (postage 6d.). Copies may be obtained on application to the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1.

New Journal Called "Metabolism"

Commencing January, 1952, and thereafter bimonthly, under the editorship of Samuel Soskin, professor of medicine at Northwestern University (Chicago), and advised by Dr. Fuller Albright (Harvard) and a panel of 16 associates, *Metabolism* is to be a journal devoted to metabolic diseases, and aspects of nutrition, genetics, endocrinology, and the effect of various drugs on them. It will publish both clinical and laboratory studies on such subjects as the role of vitamin C in protein metabolism, the effect of cortisone in chronic hepatic disease, and fat emulsion for oral nutrition. The publishers are Grune and Stratton, Inc., 381, Fourth Avenue, New York 16. N.Y., and the annual subscription $9 ($10 outside the U.S.).

Chelsea Clinical Society

The second meeting of the 55th session was held on November 13, at the South Kensington Hotel. A discussion on the origin and history of the Order of St. John of Jerusalem was opened by Lord Wakehurst, Prior of the Order, who gave a delightful description of the activities of the centuries-old organization with which he was associated. A sound film prepared by Lord Wakehurst himself was shown, and added greatly to the interest of the evening.

Tax-free Dispensing Packs in Factories

The Commissioners of Customs and Excise have decided that where a factory claims entitlement to receive tax-free dispensing packs of proprietary or branded preparations of official drugs or medicines for use in its first-aid room the order must be approved by the doctor and the drugs must be sent to him personally.

Emergency Bed Service: Applications and Admissions

During the seven days ending December 13 the number of applications made by doctors to the London Emergency Bed Service for admission of patients was 1,005, of whom 92.63% were admitted.

Institute of Social Medicine

The future of the Institute of Social Medicine at Oxford is assured only until the end of 1952, as the original Nuffield Provincial Hospitals' Trust grant of £100,000 will by then be exhausted (*Report*, 1948–51). It is still hoped that at that time the University of Oxford will take it over. Since the death of Professor John Ryle the Institute has been under the direction of Dr. Alice Stewart, and most of the work has been concerned with child health and tuberculosis.

Health and Finance Conference Report

The Royal College of Nursing has had a detailed report printed of the discussions between members of the nursing and medical professions, representatives of regional hospital boards, boards of governors, local health authorities, the social services, and other interested organizations which took place at this conference on November 7, 8, and 9. A limited number, price 4s. 6d., is available. Orders are taken in strict rotation, priority being given to those who attended. Apply at once, with remittance, to the Conference Secretary, Royal College of Nursing, Henrietta Place, Cavendish Square, W.1.

Tropical Medicine Prize

The Langley Memorial Prize has been awarded to Dr. J. H. Gerber, medical officer in charge, Endemic Diseases Control Unit, Kailahun, Sierra Leone, for his paper on bilharzia in Boajibu. This prize is awarded by the London School of Hygiene and Tropical Medicine triennially for the best paper written by a member of the West African medical staff on one of the following subjects: tropical medicine and surgery; tropical hygiene and sanitation; tropical entomology and parasitology.

Wills

Dr. William Cuthbert Whitworth left £21,188. He left the bonus payable by the Medical Sickness and Life Assurance Society to the Royal Medical Benevolent Fund.

Mr. Ellis Campbell Bowden left £57,868. After making various bequests he left the remainder of his estate to the Royal Medical Benevolent Fund.

Mr. William Edward Tanner left £16,340. He left 250 guineas to the Medical Society of London, 100 guineas to the Royal Institute of Public Health and Hygiene, and to the Medical Society of London and the Department of Surgery, Guy's Hospital, his medical books, prints, and photographs.

The Right Hon. Lord Webb-Johnson has been appointed president of Epsom College in succession to the late Viscount Leverhulme.

At the annual general meeting of the London Irish Medical Golfing Society, held on December 6, Mr. Michael J. Smyth was elected president, and Dr. D. R. Murray was elected captain for the year 1952.

COMING EVENTS

National Institute of Industrial Psychology Lecture

Professor Roger Russell will give a lecture on "Behaviour under Stress" at the London School of Hygiene and Tropical Medicine at 6 p.m. on Wednesday, January 2, outlining some of the work done in the field of experimental psychopathology related to problems of adjustment in industry. Those wishing to attend are asked to notify the secretary, National Institute of Industrial Psychology, 14, Welbeck Street, W.1.

Osler Club Pneumonia Evening

Friday, January 11, at 7.45 p.m. at the Medical Society of London will be pneumonia evening, and the speakers will be Lord Horder on Osler and pneumonia, Sir Lionel Whitby on the advent of the sulphonamides, and Sir Adolphe Abrahams on the changing character of the disease.

International Congress of Comparative Pathology

The 6th international congress will be held in Madrid, Spain, from May 4 to 11, 1952, under the presidency of Professor Enriquez de Salamanca. Papers will be presented to the following sections: mycosis in comparative pathology; trace elements; factors influencing senescence; insecticides; bacterial symbiosis. In addition there will be a symposium on the aetiology and pathology of arteriosclerosis organized by the Council for the Co-ordination of International Congresses in the Medical Sciences. Full particulars can be obtained from the secretary to the Congress, Professor Carda-Aparici, 8, Calle Fernando VI, Madrid, or from the hon. secretary, British National Committee, Professor R. E. Glover, Department of Veterinary Pathology, 42/44, Bedford Street North, Liverpool, 7.

APPOINTMENTS

CLARKE, RONALD R. J. R., M.B., B.Ch., Resident Medical Superintendent St. Columba's Hospital, Killybegs, County Donegal, Eire.

ESSEX-CATER, A. J., M.R.C.S., L.R.C.P., D.C.H., F.R.A.I., Assistant Medical Officer of Health, and School Medical Officer, County Borough of Croydon, Surrey.

ROBINS, R. H. C., M.B., B.Chir., F.R.C.S., Registrar in Orthopaedic and Traumatic Surgery to Princess Elizabeth Orthopaedic Hospital, Exeter, South-western Regional Hospital Board.

HOSPITAL FOR SICK CHILDREN, Great Ormond Street, London, W.C.—*Assistant Medical Registrar (Registrar Grade)*, A. W. N. Oatway, M.B., B.Chir., M.R.C.P. *House-physician to Professor A. A. Moncrieff (Senior House Officer Grade)*, H. J. Goldsmith, M.B., B.S., M.R.C.P. *House-surgeon to Mr. T. Twistington Higgins (Senior House Officer Grade)*, A. G. Norman, M.B., B.Chir.

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BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Terry.—On November 16, 1951, at King's College Hospital, London, S.E., to Edith (formerly Fildes), wife of Dr. J. Terry, of King's College Hospital, a daughter—Diana Margaret.

MARRIAGES

Martin-Bolam.—On October 4, 1951, at Chester, Leonard Geoffrey Cadoux Martin, M.B., B.S., to Rosemary Janet Bolam, M.B., Ch.B.

DEATHS

Bekenn.—On December 11, 1951, Justin James Bekenn, M.R.C.S., L.R.C.P., of 277, Monument Road, Edgbaston, Birmingham, aged 72.

Falkiner.—On October 28, 1951, at a nursing-home, Dublin, Alfred Cecil Falkiner, M.B., B.Ch.

Murray.—On December 9, 1951, at Royal Victoria Hospital, Cork, Herbert Edward Murray, C.I.E., M.D., M.Ch., F.R.C.O.G., Lieutenant-Colonel, I.M.S., retired, of Shana Court, Castletownshend, Co. Cork, Eire, aged 62.

O'Brien.—On December 8, 1951, Thomas Cyril Baron O'Brien, L.R.C.P.&S.I.&L.M., of 6c, Hyde Park Mansions, London, N.W., aged 53.

Ogilvie.—On December 9, 1951, at a nursing-home, William Mitchell Ogilvie, M.B., C.M., of 2, Riselaw Terrace, Edinburgh.

Pershouse.—On December 8, 1951, at 11, Rutland Gardens, Croydon, Surrey, Frank Pershouse, M.R.C.S., L.R.C.P.

Viehoff.—On December 8, 1951, at his home, Holly Hedge, 48, Moor Lane, Crosby, Liverpool, Herman Crowther Viehoff, M.R.C.S., L.R.C.P.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Smoking and Buerger's Disease

Q.—*A patient with thrombo-angiitis obliterans, who underwent a lumbar sympathectomy 18 months ago and amputation of leg nine months ago, still urgently desires cigarettes. In the past, certain authorities condemned smoking in this condition, while others held the opinion that the habit was not directly harmful. What is the present view?*

A.—Cigarette-smoking in certain individuals may diminish the peripheral blood flow, and, although this has been attributed to the temporary effect of occasional deep inspiration when smoke is inhaled, a direct effect is probable in some people. It is never wise to assume that a general belief based on long experience is wrong when some scientific experiment does not support it. By far the best test in a particular case is to find out what effect, if any, smoking has on the individual concerned. If it can be shown conclusively that withholding cigarettes for a month makes no difference to the symptoms, there is little point in continuing the restriction on medical grounds. As a general rule, however, withholding cigarettes has a beneficial effect in Buerger's disease.

Mirror Writing

Q.—*What are the likely causes of the frequent transposition of letters and words in the writing of a normally intelligent 12-year-old boy? "Of" is written as "fo," "on" as "no," "carpet-slipper" as "slipper-carpet," for example. What is the prognosis and treatment?*

A.—Mirror-transpositions of letters, syllables, and words (collectively known as "reversals") are made by normal children in the course of learning to read and write. Their persistence into the second decade may be due to the child's own efforts (many children make a game of mirror-reading and mirror-writing); or may be associated with backwardness in reading and writing, whether secondary to disease, absence from school, or emotional disturbance, or of the congenital type ("specific dyslexia"). The diagnosis must rest upon a comparison of his mental age (assessed on a reliable non-verbal test) and his reading and writing ages, together with an adequate history and neurological examination. It is worth recording here that Leonardo da Vinci wrote many of his notes in mirror writing.

If there is no scholastic retardation, the occurrence of reversals needs no treatment: if there is, this must be dealt with in a manner appropriate to its cause. It is probable that, excepting the more severe cases of specific dyslexia, most cases of backwardness in reading and writing respond to reassurance and remedial training by an experienced teacher or educational psychologist.

Antibiotics and Cultural Characteristics

Q.—*What effect have antibiotics on the cultural characteristics of Pseudomonas pyocyanea? After treatment with streptomycin I have had difficulty in identifying organisms in a chronic infection with a previously typical pigment-producing strain. Since stopping streptomycin therapy—the organisms rapidly became resistant—pigment production has been resumed. What is the explanation of this?*

A.—Exposure to sublethal concentrations not only of streptomycin but of other antibiotics, other chemotherapeutic agents, and even ordinary antiseptics may cause a

variety of changes in the cultural characters of bacteria. Growth rate is usually reduced, capacity to ferment certain sugars may be lost, and some characteristic product such as a toxin or a pigment may cease to be formed. Descriptions of such changes are widely scattered throughout the literature, particularly of antibiotics: authors who specifically refer to the loss of pigment production in *Ps. pyocyanea* under the influence of streptomycin are Seligmann and Wassermann (*J. Immunol.*, 1947, **57**, 351).

Threadworms

Q.—*Where can I find information on the treatment of threadworms?*

A.—On p. 219 of the book "*Any Questions?*" The book can be obtained for 7s. 6d. (postage 6d.) from the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1.

When Surgeon and Anaesthetist Disagree

Q.—*If there is disagreement between surgeon and anaesthetist on what anaesthetic should be used in a particular case, who has the final word?*

A.—There might be exceptional cases where, in special circumstances or by reason of special arrangement, the anaesthetist acts as an agent of the surgeon, or where for some other reason the surgeon is entitled to the final word. In the ordinary case, however, the anaesthetist carries out his work as a skilled individual with full responsibility, and it is unlikely that a coroner or other law officer would consider otherwise than that he bears full responsibility for the choice and administration of the anaesthetic. Needless to say, it is advisable and preferable for the anaesthetist and surgeon to be continually in friendly consultation, not only about the choice and method of administration of the anaesthetic, but about the patient's general state of health before, during, and after the operation. If there is complete disagreement on what anaesthetic should be used, it is better for another anaesthetist to take over the case.

Bruising and Fibrositis

Q.—*In patients with clinical fibrositis of a group of muscles and no history of injury, I have noted the appearance of bruising of the skin overlying the muscles. What is this syndrome, and what is its explanation? How should these cases be treated?*

A.—No definite syndrome of this nature is recognized. By "clinical fibrositis" it is presumed that deep pain and tenderness are meant. These can occur in muscle groups in a segmental distribution and may be due to local muscle spasm in some cases, as has been demonstrated by Elliott (*Lancet*, 1944, **1**, 47). Under these conditions it is possible that local trauma might occur which would lead to haemorrhage, although it is difficult to imagine that this would become visible in the skin. The writer has seen one case in which spontaneous bruising regularly appeared over the site of deep pain, but there seemed in this case no relation to any particular group of muscles. Another case in which haemorrhage in muscle was found at biopsy to be the cause of so-called "fibrositis" had an entirely normal skin.

The recent paper by A. V. Hill (*Lancet*, 1951, **2**, 947) may be relevant: he explains ordinary stiffness following unaccustomed use on the basis of actual physical trauma to the muscle tissue, and varying degrees of this could theoretically exist. An alternative explanation may lie in the possibility that, in fact, muscle groups were not involved in the cases observed, and that the level of tenderness was misinterpreted as being deep when really it was the subcutaneous fatty tissues which were involved. Copeman's hypothesis of the tension syndrome (*British Medical Journal*, 1949, **2**, 191) might then provide an explanation. This hypothesis suggests that under certain circumstances the fatty tissues may come to be under tension as a result of fluid retention. In this condition the tenderness can be shown to be superficial to the muscles by squeezing the subcutaneous tissues between finger and thumb. It would be worth while observing whether this is so in the cases described. One presumes that the possibility of bruising as a result of massage, self-applied or otherwise, has been excluded.

In the absence of a certain explanation of these cases no specific treatment can be recommended other than the application of heat.

Coiffeur de Dames

Q.—*(1) Is there any occupational disease associated with ladies' hairdressing? (2) Is there any substance in hair dye, permanent waving solution, or other lotions used by hairdressers which could give rise to inflammation and soreness of the gums in the absence of other symptoms?*

A.—(1) Abstract No. 2672 in *Excerpta Medica* (1949, Part IV, **2**, 551) refers to a concise study of occupational diseases and accidents in hairdressers. Dermatitis is common. It may be initiated by alkalis and certain soaps, but is more often due to sensitization to hair dyes containing phenylenediamine or to the use of "cold-wave" solutions which contain thioglycollic acid.

The phenylenediamine prepared commercially for use as a hair dye is usually a mixture of *meta-* and *para*-phenylenediamine. Nott (1924) and Israels (1934) report systemic poisoning in hairdressers who were remarkably susceptible to the effects of absorption of phenylenediamine. Gastro-intestinal symptoms occur and may be associated with dizziness, weakness of the legs, and syncope. There is usually a latent interval, which may be as long as 48 hours, between the last exposure to the dye and the onset of symptoms. In the case described by Nott (1924) the gums were "swollen, standing away from the teeth, and purple." No case of dermatitis has been recorded in persons who develop systemic poisoning from phenylenediamine.

Thioglycollic acid is a constituent of most "cold-wave" solutions. Repeated use of these solutions without the protection of gloves causes softening of the skin, particularly of the fingers. The finger-nails also become soft. There is little inflammation associated with the softening, but areas of the skin will peel off, leaving painful ulcers which may become infected. Cotter (1946) records cases of illness, including evidence of liver damage, which he attributes to prolonged exposure to cold-wave solutions.

(2) It is possible that the inflammation and soreness of the gums in this patient are due to an unusual susceptibility to phenylenediamine. In the "cold-wave" process thioglycollic acid is mixed with ammonia to form ammonium thioglycollate, and the odours of ammonia and hydrogen sulphide are familiar in any modern hairdressing salon. Repeated inhalation of these might give rise to irritation of the mucous membrane of the mouth, but one would expect the nose and throat to be affected also. Finally, it is unfortunately a not uncommon habit of hairdressers to put into their mouths pins which have been used repeatedly and taken up from the floor and which have not been sterilized.

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